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AVIATION EDUCATION NUMBER

Aviation-World Outlook Today
Aviation Education in the Air Force Reserve
Women in Aviation
The Expanding Rôle of the Smithsonian Institution in Aviation and Education
Education for Air Age Citizens:
The Air Force R O T C
Aviation Education and the School Administrator
The Civil Air Patrol and Aviation Education
The Story of the Link Foundation
Air Age Geography—Yesterday, Today and Tomorrow
Aviation Education in California
High School Aviation Education and the Aviation Education Program in the Clover Park Schools Washington
The United States Office of Education and Aviation Education

A MAGAZINE DEVOTED *to the* SCIENCE, ART, PHILOSOPHY *and* LITERATURE *of* EDUCATION

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EDUCATION

VOL. 76 SEPTEMBER, 1955 No. 1

Aviation—World Outlook Today

By DR. JOHN FURBAY

Director, Air World Education, Trans World Airlines
380 Madison Avenue, New York, N. Y.

WE have recorded about 6,000 years of the history of man. Beyond that, we don't know. There were probably thousands of years not written down because men had no written language. Last summer I saw paintings on cave walls in France estimated to be 30,000 years old. There was no written language then but people drew pictures of buffalo and bear, and they were very good likenesses, indicating that there were people who had both brains and artistic sense even then.

It is not easy to give a thumb nail sketch of the history of man, but I would like to try it, to see where it leads us.

For at least the first four thousand years of this six thousand, all the civilized areas of the world were situated on water. One cannot name a single city which was then in existence, or a major civilization, which was not sitting near water, because transportation was almost entirely by water.

By land, one could travel only a short distance back from water — perhaps 50 or 75 miles, by pack animals. Beyond that, there was practically nothing. But on the Tigris and Euphrates rivers there were the great kingdoms of Babylonia and Assyria. Wars brought such great destruction on these people that they could not recover, and civilization moved on, westward, to Egypt and the Mediterranean area. This Mediterranean culture was destined to become the pattern for our life today.

But this again was sitting on water. Less than 10% of the world was civilized then. What was in the land masses? Simple people, backward people, living in undeveloped areas while a great civilization flourished around the Mediterranean. The ancestors of nearly every one of us were living in the undeveloped areas, untouched by civilization because transportation had not yet penetrated the land masses of the world.

Why was all the culture and civilization of the world on water? Because here people were able to ship goods; and commerce was thriving. And where people exchanged goods, they exchanged ideas. Where they exchanged ideas, their culture grew and thrived. I cannot understand people who talk about a conflict between business and culture; you cannot have one without the other. No great culture has ever been born or has thrived in any part of

the world, except where there was good business.

Our own north European ancestors were then as isolated as the people in the middle of Africa or the people in central Asia, have been up to the present time. They lived in isolated valleys, in caves. They ate raw meat, had no written language, and were able to count only on their fingers and toes.

Our people had no system of mathematics; no idea that, in the Mediterranean, the Arabs had developed the complicated system of mathematics we know today and still call "Arabic numerals". They had even created a philosophy out of mathematics. They created the "zero", and thus the tens, the thousands, the millions, the billions. I often wonder what they would do in a tax office today if it hadn't been for the Arabs. They'd have a hard time counting all that on their fingers and toes! But OUR ancestors were still counting on their fingers and toes, all those thousands of years. The Arabs, furthermore, were able to progress from the KNOWN to the UNKNOWN by a system they called "Algebra".

For medicine, our people had witch doctors. We were still the "backward people" of the world. We didn't know that in Egypt the science of medicine had grown and advanced to a point where even today our great medical universities administer the Oath of Hypocrates, which came out of the medical schools of Egypt before the birth of Christ.

ARCHITECTURE: What did we know about architecture—living in caves? We had no concept of the beautiful structures the Greeks had developed, which were to set a pattern for all western civilizations. The only real improvement we have added even today is air conditioning!

PHILOSOPHY: The system which the Greeks had developed—what could we know about such things, living in isolated valleys where the only thing to talk about is how to skin a rabbit, or catch a skunk. That's about as far as our minds were able to progress because we couldn't get our thinking out of the valleys. A person's thinking is always limited by his physical horizons.

RELIGION? We had nothing but paganism. We worshipped sticks and stones, the sun, fire and water. We had no idea that in the Mediterranean, the Hebrew people had developed the advanced idea of One God, instead of hundreds. We didn't know of the birth of Jesus Christ and the founding of a whole new creed, not of punishment, but of love. We didn't know this because transportation and communication hadn't brought it to us.

Then something happened. All the culture of the Mediterranean fell into the hands of the Romans, who had taken possession, politically. These Romans did something which had never been done before: they built roads from the shores of the Mediterranean right into the land mass of Europe, and over those roads travelled the culture and civilization of the Mediterranean.

There went the soldiers, the business men and the missionaries; these men deposited the package of Mediterranean culture on the doorsteps—cave steps if you want—of our ancestors in Northern Europe, Middle Europe, and the British Isles.

We were suddenly confronted with a new way of life (exactly as the backward peoples of the world who are today emerging and seeing a new way of

life). We took a good look at this package of "culture" deposited on our doorstep; we pawed around in it a long time. There was art, and music, religion and philosophy. These didn't ring a bell with us—they are still something we don't quite understand. But there was one thing which we DID understand, something never developed even by the people who had discovered it—this was the principle of the WHEEL.

We crawled out of our caves and studied the wheel, which the Arabs had discovered but didn't know what to do with; and we developed from it the machine age which changed the whole pattern of man's civilization.

Now look at the parallel. Think about the world today. Twice as many people in the backward areas as in the civilized areas—and they have suddenly found themselves in full contact with our modern civilization. I wonder what idea out of our civilization of today will ring a bell in THEIR consciousness—what will make them say, "This is what we've been looking for". Perhaps it will be something we knew was there, (just as the Arabs knew the wheel was there) but haven't done much to develop it. Maybe they'll develop this into a new kind of civilization.

I will be willing to bet that while these people who are learning civilization from us today are certain to take the machines we've made, and use them, that their great contribution to civilization will be something we've bypassed. Judging by what I know of the people of the Orient, I would say that it is likely to be something of a spiritual nature. Perhaps a new concept in human relations.

Think of Gandhi, who developed a whole new idea of how to fight a war of independence, not by resistance, but by NON-resistance; not by threatening others, but by starving himself.

Now, let's get back to our thumb-nail sketch. We had man out of the cave and we got him on to wheels. Then came the machine age, producing railroads and highways which made it possible to have countries like Canada and the United States of America.

We planted cities in the middle of land masses where there was no water. We couldn't have done this without the machine. We didn't do away with the water transportation already existing; we simply opened new territory, and made a greater flow of goods for everybody, by both sea and land.

Now, we've come to the third stage of man's great effort to get around in the world. First by water, second by land, and now he has escaped from earth-drag and has achieved the thing he has always dreamed of—to fly like a bird. Remember the wonderful poem written by John Gillespie Magee when he flew far above the clouds:

Oh! I have slipped the surly bonds
of earth
And danced the skies on laughter-
silvered wings;
Sunward I've climbed, and joined
the tumbling mirth
Of sun-split clouds—and done a
hundred things
You have not dreamed of—wheeled
and soared and swung
High in the sunlit silence. Hov'ring
there
I've chased the shouting wind along,
and flung
My eager craft through footless halls
of air.
Up—up the long, delirious, burning
blue

I've topped the wind-swept heights
with easy grace
Where never lark, not even eagle
flew—
And, while with silent lifting mind
I've trod
The high untrespassed sanctity of
space,
Put out my hand and touched the
face of God.

This is the kind of thing aviation has done. The freedom it gives us from feeling earth-bound. It is the only UNIVERSAL means of travel man has ever had. He can now go ANY PLACE the air goes, and the air goes EVERYWHERE. Earth limitations no longer restrict him as they have done for these thousands of years. New highways through the skies were now possible.

Remember the siege of Berlin. There, a city of 4½ million people lived for one year and one month, completely cut off from the world by any form of surface transportation. Everything they wore and ate and burned in their stoves to keep them warm came to them by air.

In Korea we discovered that it was often quicker and easier to fly the wounded to a hospital in the United States than to take them overland to a distant hospital in Korea.

One can readily see that aviation is not actually in competition with ships, railroads, or highways when its big use is to open up that remaining two-thirds of the world which was never opened before.

It will bring more commerce, trade, and industry in those areas, and these will flow on all forms of transportation —we know that.

And it is this opening of the other two-thirds of the earth which is bringing the big problems of our time. Chiang Kai-Shek said it would have been impossible for anybody to ever have united China without the airplane. Also the interior of South America was unopened by any transportation before the airplane—and in Africa it's the same story. Just a little fringe around the edge had been opened to trade previously.

I will never forget living three years in Liberia. There was no railway in the country and only 65 miles of road. When you came to the end of that road, there was a river that had never been bridged. It illustrates how man's travel over the SURFACE of the earth has always been stopped by rivers, mountains, deserts, and oceans: barriers to man and to his civilization.

In the Orient we have the same picture. When the Japanese closed the Burma Road, we flew over the "Hump", the great Himalayan Mountains. We delivered more tons of goods in one day by air than the Burma Road had ever carried in a full year. If we can do that in a war, what could we do in peace?

In my office in New York, I have an aviation map of Africa. It looks like a spider web. One of my friends, an aviation geographer, recently amazed me by saying, "Do you realize that there is no part of Africa today more than a hundred miles from some kind of an Airport?" Twenty-five years ago you could find yourself 1,000 miles away from any transportation which would connect you with the outside world. But today everybody, in all those retarded areas—South America, Africa, the Middle East, the Orient—is in touch with our civilization and all the

things we know. How long will it take them to catch on with technical knowledge? Not very long: a few generations. Everything you and I know, we learned since we were born—in ONE generation!

If Iran hadn't had a thousand students in the United States, Canada and Europe, studying oil refining, they wouldn't have thought of taking over the oil fields from the British and running them themselves. These students could learn everything I could learn or my son could learn, now that they were exposed to it.

How will all this affect us? I've only spoken about the physical changes aviation has brought: the wiping out of physical barriers, and bringing the world closer together. But aviation is going to do more.

I think the most important influence of aviation is yet to be felt, and that is the impact on people's minds, their thinking and outlook. Outlook is determined by physical horizons, and when you push those horizons out a thousand times farther than they were before, you cannot but change the thinking of the people. Our modern financing firms have far-flung arms all over the world. Just to be a part of such a system expands the minds of everybody.

Aviation is making "boundary lines" less significant. First, the physical boundary lines between ocean and land, then the political boundaries between one country and another. You don't know when you leave the United States and enter Canada. Nobody stops you at the border—you go right over. You can go over ten countries like that if you have enough fuel, without ever stopping, and you aren't aware of any boundary you cross.

But when you're down on the ground, boundary lines are significant. Officers stop you at these borders and make you open up your baggage; they examine your passport;—you are compelled to be aware of the boundaries. But when you fly, it's continuous air—indivisible.

As for cultural boundaries, look down in the valleys: you don't know what language they're speaking as you pass from one to the next. Is it French there? Is it Italian here? You don't know. As a matter of fact, it doesn't matter which language they're speaking — they're all saying the same things anyway. You become aware of a common denominator. You know that some of the people are talking sense, some nonsense; some are talking philosophy, some religion; some are talking art or music; and some are talking plain gossip. It's about the same proportion of each in all the valleys, no matter what the language.

Now let's talk religion. From the air you see churches in the valleys, but you can't see the NAMES on them. I have often thought while flying that it would be a wonderful thing to be God and not ever have to concern yourself with the names of churches. You would look for something deeper. You would look into the hearts of the people in those churches, and if they're sincerely wanting to find God, if they're searching for a relative set of values of right and wrong—then they will surely find them, and the valley is better for having such people.

Now, the next surprise is that you don't know what colour of skin the people have down there in those valleys

you are flying over. This once made a lot of difference when we crawled around on earth. We set up all kinds of barriers, with hatreds and prejudices based on such things. But when you fly, you're too far away for superficial things like that. Another boundary line is slipping out of sight.

When you look down into the valleys below while flying, you want to know only one thing; what KIND OF PEOPLE are down there. What have they done to their valley? Does it look well cultivated? Does it have good systems of irrigation, and railroads, and do they have a good airport? When you travel around the world these days, you judge a city by its airport.

If they have a poor airport, you say the people are asleep. If they have an up-to-date one, you say they are looking into the future, just as progressive cities did when the railroads came through, and if you were a town that helped the railroads, you were a town that grew. The same is true of aviation today.

Aviation is changing the general culture of the world. In a few generations, we will probably see something emerge which will be quite different. I believe it will be better, if we can only hold our heads and keep the world from exploding in our faces while we're going through the transition.

As I see it, that is the picture of aviation today and the impact of it on our world. That's why I like aviation. Maybe those of us who fly become dreamers. Maybe we are a little "touched". When you fly by day you see the sun shining up above the darkest clouds, and the moon and stars at night, and you realize that perhaps we have been looking at the wrong side of the clouds too long.

Tennyson — who was a kind of prophet — foresaw the air age and that it would change man and his world more than anything that had ever previously happened. In "Locksley Hall" you will remember, he wrote these lines in 1842:

"For I dipped into the future
Far as human eye can see
Saw a vision of the world
And all the wonders that would be.
Saw the heavens filled with commerce
Argossies of magic sails
Pilots of the purple twilight
Dropping down with costly bales.
Heard the Heavens filled with shouting
And there rained a ghastly dew
From the nation's airborne navies
Grappling in the central blue.
Far along a world-wide whisper of the south wind rushing warm
With the standards of the people plunging through the thunder storm
Till the war drums throbbed no longer, and the battle flags were furled
In the parliament of man, the federation of the world."

And it has happened as Tennyson wrote it. Aviation has opened up the world and many changes are on the way. It's going to be interesting to stick around and see what happens.

Aviation Education *in the* Air Force Reserve

By LT. GEN. LEON W. JOHNSON, USAF
Commander, Continental Air Command
Mitchell Air Force Base, New York

AVIATION education within the Air Force Reserve is synonymous with training, and Regular Establishment responsibility for supervision of its application has been assigned to the Continental Air Command (Con AC).

To discharge this function, Continental Air Command is provided with four subordinate numbered air forces—the First, Fourth, Tenth and Fourteenth — each having a specific area of responsibility.

Described generally, these areas are as follows: First Air Force, the New England and Middle Atlantic States; Tenth Air Force, the Mid-western States; Fourteenth Air Force, the Southern and Southwestern States; Fourth Air Force, the Pacific Coast States.

Within these ConAC numbered air forces, at air force bases and civilian air ports throughout the nation, are 24 Air Reserve Flying Centers staffed by Regular Air Force personnel. The Flying Centers were established to provide assigned Air Reserve units with a standardized, comprehensive training program. Staffs of the Flying Centers are responsible for supervising the training of assigned Air Reserve units, maintaining organizational equipment and aircraft, and providing logistical and administrative support and other required assistance.

Major Air Reserve units assigned to the Flying Centers are the Air Reserve Flying Wings. At the present time there are 24 Reserve Flying Wings organized and functioning similarly to like-type wings of the Regular Air Force. These combat-type units consist of 13 troop carrier wings, nine fighter bomber wings and two tactical bombardment wings.

The Air Reserve wing structure includes two combat support wings, popularly known as air depot wings.

The Air Reserve unit training program also encompasses other support type units such as aerial port, and airways and aerial communications service squadrons and flights. It is planned to activate additional Reserve flying and support units as facilities become available.

At present, each Reserve wing and its subordinate units are physically located at the same Flying Center. However, plans call for eventual detachment of certain tactical squadrons from the parent wing, at which time there will be Reserve flying training activities at approximately 60 strategically located sites throughout the United States.

Since the latter part of 1952 over 650 aircraft have been received for Reserve flying training. Fighter bomber wings are now fully equipped with F-80 jet aircraft. The troop carrier wings

are flying C-119's and C-46's, and the tactical bombardment wings B-26's and F-84's.

The flying training program has expanded rapidly. During the twelve-month period beginning in July 1952, Reserve pilots flew a total of 57,000 hours, and in the following similar period 72,000 hours. During the initial seven months of the current fiscal year they had logged over 112,000 hours.

Assisting ConAC in the training of Reserve wings are other major commands of the Air Force, to which they will be assigned in event of mobilization. This support, which we consider extremely vital for proper training of these Reserve units, has been diligent and effective.

The general public is often prone to think of augmentation forces solely in terms of units; yet, thousands of prior service personnel not affiliated with the Air Force Reserve wings possess qualifications which, in time of emergency can be well employed in the Armed Forces. It is, therefore, to our benefit to maintain these skills and qualifications through the medium of our individual training program. This has been accomplished through two principal operations: the Mobilization Assignee and Designee Programs and the Specialized and General Military Training Programs, conducted through the Air Reserve Center.

A Reservist, who by virtue of previous military experience or civilian occupation, is qualified, may serve as a Mobilization Assignee or Mobilization Designee, with an active Air Force unit. This program not only provides the Air Force with trained manpower on M-day, but also with qualified individuals who can help accomplish special peace-time projects while training with active units. Their training consists of working in the unit to which they will be assigned. Therefore, they acquire first-hand experience and training that can be put to immediate use when called to active duty.

Mobilization Assignees are encouraged to participate in 24 inactive duty training periods and are authorized pay for 12 of these. Each assignee is required to attend one 15-day active duty training tour per year. Those who possess aircrew ratings may be authorized to fly.

Mobilization Designees normally have civilian jobs so closely paralleling their Air Force Specialty that regular attendance in inactive duty training periods may be waived. They may train for point credits, but no pay is authorized. If funds permit they may be given the chance to attend a 15-day active duty training tour.

Currently about 8,000 Mobilization-Assignee-Designee spaces have been filled. With increased emphasis being given to this program by all the major commands, filling approximately 10,000 more authorized spaces should be realized before too long.

The *Air Reserve Center Program,* which began last April, has been designed to assist in meeting our mobilization requirement for individuals who have had Air Force experience and are trained in Air Force specialties. These Reservists will be mobilized as individuals and assigned in the Air Force in accordance with their qualifications and the needs of the service following M-Day. Instruction is conducted for the basic purpose of keeping Reservists fresh in their air force skills, and thor-

oughly abreast of Air Force developments so that they will be alert and ready for mobilization.

Although Reservists will be mobilized individually, they are organzied for training purposes into Air Reserve groups, squadrons and flights, commanded by ranking Reservists on active duty. This promotes flexibility within the program, reduces workload on active duty personnel and provides Reservists with continuing command experience.

This is an evening program. Our centers are located in downtown metropolitan areas to facilitate attendance at training sessions. The centers provide well-equipped classrooms and laboratories, a library, administrative offices, and an assembly hall. Air Force personnel assigned to the center administer or conduct instruction in the centers and also supervise instruction in outlying units within their areas.

This is a new and expanding activity. It is a consolidation of extensive previous Reserve activities into a unified program permitting more effective supervision and control. We now have 79 centers activated. Our plan calls for locating a center in those areas in the United States where the size and scope of Reserve interest and participation warrant.

Two types of training are offered by the Air Reserve centers: General Military Training and Technical Training.

The General Military Training Program provides a broad and effective basis of instruction to the largest single group of Reservists on the widest geographical spread. The training is designed to maintain interest in the Air Force, orient and refresh Reservists in current Air Force policies and organization, and improve their ability to perform effectively when called to active duty.

Approximately 31,000 Air Reservists participate in general military training. Many training flights are located in small communities remote from metropolitan areas, and are usually composed of officers and airmen with diversified occupational skills and grades.

Centrally prepared training materials developed by the Air University are provided all general military training flights. Group discussion or seminar-type instruction is used to increase individual participation and improve self-training. The discussion leader briefs himself, using detailed instructions, and presides over the program for the evening. The assignment of discussion leader is usually rotated through the unit.

Discussion exercises for this year include topics ranging from basic air doctrine and the air war in Korea, to public speaking, organizing to write, and methods of group discussion. These training materials may be supplemented by guest lecturers from Air Force and civilian activities and by training films made available to the units. Training is supervised by the Air Reserve unit commanders who are assisted by liason personnel provided by the Air Force and assigned to the Air Reserve centers.

Units normally schedule from 24 to 48 meetings a year. Many Reservists attend 75 percent of these meetings. They do not receive pay for this training, but are awarded point credit to maintain their good standing in the Air Reserve. Their participation also is a basis for promotion, accruing retirement benefits, and some training tours of active duty.

The interest of qualified Reservists is

the basis for general military training. This does not provide sufficient numbers who have and are proficient in those skills needed by the Air Force. To meet these Air Force mobilization needs and to the extent that Reserve potentials exist, we have provided a *Technical Training Program.*

Those who enroll in technical training are paid for an authorized 24 drills a year. In return, they must be available for mobilization in an emergency declared by the President, as well as one declared by the Congress. They must attend the training sessions regularly, and are required to prepare for each session. They must take tests and final examinations. They are not permitted to continue in the program unless performance has been satisfactory in every respect.

These Reservists are required each year to attend a 15-day tour of active duty, during which they are given on-the-job training designed to complement the course of instruction they have received.

Reservists who cannot meet all of these requirements may enroll in specialized courses without inactive duty training pay. They must, however, meet the same training and participation standards. Depending upon available funds, 15-day tours of active duty may be offered. While they are trained to be more proficient in their field, they also earn points for advancement and retirement credits.

The courses of instruction for technical training are given the same care that the general military training materials receive. The majority of the technical courses are prepared by the Air Training Command upon ConAC request, and subject to our review. These courses typically consist of a student text or study guide, a student workbook, an Instructor's Guide, and centrally prepared examinations. Detailed instructions are provided to insure quality of instruction; but the instructor is also given some latitude to permit adjustment of materials to the students.

Some of the Regular Air Force personnel required to perform normal housekeeping duties (Administrative, Personnel, Supply) are trained as instructors by the Air University or Air Training Command and assigned to Air Reserve centers. Double utilization is thus made of their services.

Wherever Reserve personnel are available who are exceptionally well qualified in their specialty, and possess a military or civilian teaching background, their services are utilized. This is a very economical way of providing professional instruction, but is necessarily limited to those areas where qualified Reservists are available.

Maximum use also is made of professional teachers from nearby civilian educational institutions. These instructors are contracted for on a part-time basis to teach a given course, and this method has proved to be a very economical way of providing top quality instruction.

The present ratio of instructors teaching specialized courses in the Air Reserve Center is 171 military, 302 Reservists, and 344 civilian. By the end of last June nearly 23,000 reservists were enrolled in 817 specialized courses.

Now, how will these personnel resources be utilized? Mobilization plans provide for the recall of all Reserve combat wings as soon as possible following M-Day to be employed by TAC and

CADC. Personnel not assigned to Air Reserve wings and support squadrons will be ordered to active military service individually and phased into the Air Force structure to meet, insofar as possible, manpower requirements over a period of 12 months following D-Day.

Last year ConAC instituted a training designation program for personnel undergoing general and technical training which is designed to augment the mobilization program by earmarking certain individuals for assignment to major air commands of their preference. Under this program commanders actually will have a bird-in-the-hand in knowing that an individual is available to meet the mobilization requirements. This program should greatly aid and speed up the mobilization program.

In this article I have pointed up the need that the regular establishment has for the Air Reserve. Likewise, the Air Reserve requires your complete and wholehearted support and assistance. You educators, as individuals, can partially furnish this support by identifying and establishing cordial relations with individual Reservists in the vicinity of your homes, and encouraging them to solicit your advice and assistance where needed, and informing your students of the Air Reserve program.

The Psychology of

CHILD DISCIPLINE

by

Russell N. Cassel Ed.D.

Research Psychologist, U. S. Air Force
Vice President, National Correctional Psychology Ass'n

This booklet gives primary consideration to the role of the parent and teacher as a disciplinarian. The first four chapters deal with major aspects of the discipline problem. The last two chapters present a background of basic psychological theory and a summary of current trends.

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Women *in* Aviation

By JACQUELINE COCHRAN
Vice President, National Aeronautics Association
1025 Connecticut Avenue, N. W., Washington 25, D. C.

I HAVE been invited by the Editor of this edition of *EDUCATION* to contribute an article on the rôle of women in air age education as indicated by the title. I was deeply impressed with the list of authors who have been invited and indicated their acceptance for developing articles in the various other areas of air age education, and which now are a part of this edition. The whole history of my life as summarized in my recent book *The Stars at Noon* published by Little, Brown and Company, Boston, Massachusetts, reflects two primary accomplishments which I have striven for since my days of youth and the beginning of my career as a pilot back in 1932:

> . . . . . The first and foremost of these objectives is the general promotion of aviation and gradual pushing back of the frontiers of knowledge in this area.
>
> . . . . . The second was to increase the importance of the rôle which women play in the field of aviation.

I have become so imbued with the promotion of these objectives that I try never to pass up an opportunity to participate when these ends might be fostered.

I am certain that our teachers for whom this magazine is intended, and who are the intended primary readers of this material make a great contribution daily towards each of these objectives. To this end, I am grateful for the opportunity to visit with you through this article.

Women have played a vital rôle in aviation education since its very beginning. Madame Blanchard of France was a great balloonist at the s' ' of the nineteenth century. Kätche' ·ul- us of Germany was beating all of her male contemporaries in competition and was looked upon as an air marvel during the latter part of that century. She made more than five hundred balloon ascents and about two hundred parachute drops. This took place before the renowned airplane flights by Orville and Wilbur Wright.

Harriet Quimby was the first American Woman to hold an airplane pilot's license back in 1911, and she was soon followed by the two Moisants, sisters of the famous pilot John Moisant who crashed to his death in 1910. Then followed Ruth Law with a pilot's license in 1912. She made a women's altitude record of 11,200 feet in 1915 and in 1917 won a race by flying nonstop for 590 miles. Ruth Law tried unsuccessfully to join up with our own and French Air Forces in World War I, and finally in an honorary uniform flew about the United States helping in recruiting and government loan drives.

Katherine Stinson was another early bird dating from about 1912. She flew in the interests of the Red Cross and similar efforts during World War I, now lives in Santa Fé, New Mexico, and was

one of the timers at the Santa Fé turn when I did the 2000-kilometer record. Katherine and her sister, who learned to fly in 1914, opened a flying school and trained Canadian pilots while brother Eddie Stinson trained pilots at Kelly Field for our own air corps. The present Stinson private plane is named after him. Phoebe Amlie came into the air picture in 1922.

Then Amelia Earhart came into the front view. Her first publicized flight was across the Atlantic in 1928, but she was in fact only a passenger on the trip and did not like the false credit. She cleared this up by her later flight across under her own power. She had achieved an altitude record of 14,000 feet some years before this. During the Amelia Earhart era a substantial group of women were outstanding flyers, some of whom were Blance Noyes, Nancy Love, Helen McCloskey and Helen Richey.

The story of the WASP and their World War II contribution is a saga of real accomplishment. WASP is a synthetic word meaning Women's Airforce Service Pilots, as WAC means Women's Army Corps.

During the early part of World War II, I was invited back from England by General Hap Arnold where I was on official duty with the 8th Air Force to organize and head up the WASP Training program, a position which I held during the entire period of the war. My official report was made to General Arnold.

At the close of the war I indicated that more than 25,000 women applied for women pilot training. Eighteen hundred and thirty (1,830) were accepted. 30.7% were eliminated during training for flying deficiency and another 2.2% for other reasons, with consequent lower elimination rate than among male cadet pilots. Eight (8) percent of those accepted resigned and 1,074 graduated or 58.7% of the total. Of the 1,074 who graduated, 900 remained at time of inactivation, or 83.6% of the graduates, to which should be added 16 of the original WAFs employed who were still with the program at time of inactivation.

The women pilots, subsequent to graduation from the training program, flew approximately 60 million miles for the Army Air Forces: the fatalities were 38, or one to about 16,000 hours of flying. Both the accident rate and the fatality rate compared favorably with the rates for male pilots in similar work.

The history of the role of women in aviation is directly connected with my first objective referred to "the promotion of aviation and the pushing back of the frontiers of knowledge". In connection with this interrelationship, I am minded of the first production models of our B-26 airplane and the response of the military pilots to this new aircraft. It was known as the Baltimore prostitute because it was made in Baltimore and had no visible means of support; that is to say, its wing area seemed too small for the weight of the plane. Many accidents occurred. Few planes returned from the first missions of B-26s that went out from England over Europe. The pilots generally feared the plane, but, because it was in quantity production, a great problem was presented to the General Staff. General Barney Giles, my chief at the time, went out and flew it time after time himself and would bring it in for landings at even less than the air speed indicated for safety in the manuals. He and others

were sure the plane was all right. I then flew it and could find no serious fault.

I asked General Arnold to let me assign twenty-five girls right out of Sweetwater to the B-26 transitional training base and if they proved satisfactory to let them fly this plane in operations. The suggestion was approved. These girls did a fine job. They weren't afraid of the plane because they hadn't heard the underground rumors about it. They made the male pilots' faces red for a while and then the B-26 suddenly became accepted as the safe plane. (I see one flying around even today as an executive plane.) The only accident the girls had in the many thousands of hours in the B-26 was when two planes collided in the air. The B-26, with my WASP in it, made the airfield for a safe landing; the girl was so excited, however, that she left the plane while the propellers were still turning and walked into one of them. She was quite badly cut, but not killed as is usually the case when pilot and propeller meet.

Another time the men pilots were complaining that the B-29 would not safely fly on only two of the four engines as it was supposed to do. We sent two WASPs in a B-29 from base to base, flying back and forth on two engines. The obvious conclusion was that if a woman could do it, so could a man.

As I reflect backward through my list of aviation accomplishments which I fought to attain, the coveted awards held by male pilots beginning with the General "Billy" Mitchell Award in 1938 as the American pilot who during the previous year had made the greatest individual contribution to aviation, and 16 years later the Gold Medal of the Federation Aeronautique Internationale for the outstanding accomplishment in aviation, the main motivation was to increase the role of women in the area of aviation.

When I attempted to break the sound barrier in the Canadian built and powered sabre-jet in the Spring of 1953, I am minded of the $10,000 insurance required by Lloyds of London, this being an indication of the risk in life and property involved in the objective. Often in connection with this safety factor I have reiterated my philosophy on this point: Survival is a certainty, I believe. Therefore death is not something to be feared. I do not fear it. Dying is easy. It is living that becomes difficult at times. I do not feel sorry for a person who has passed on but if that person has been close to me I am sad about my own lonliness. I miss the departed friend but am not missed. Dying is as natural a step in a process of progression as being born or eating or falling asleep. I may have had a delightful day on the golf course or an unfinished piece of work at the end of the day, causing me at bedtime to wish that the day had been longer, but I don't yearn to sit up all night for this reason. In the same way I might wish to carry on a trifle longer with my present body and mind as a team to finish something immediate which can be helpful to others or interesting. But it would only be for a moment. I would be more likely to wish for a longer breathing period, for an Eisenhower or an Einstein. But nature works effectively in another way than by extension of bodily life of a particular person.

In my trips throughout the various

countries of the world, I have observed on a national level the organization of Royal Aero Clubs abroad. These clubs serve to promote the rôle of aviation among our youth but also include women as well.

Partly through my influence, Mr. Floyd B. Odlum, Chairman of the Board of Atlas Corporation; Mr. Fred Crawford, Chairman of the Board of Thompson Products; and Mr. John J. Hopkins, Chairman of the Board of General Dynamics Corporation organized a foundation and provided a fund of $25,000 in February of this year for the initial organization of such clubs in this country. Additional money for the next two years of $25,000 per year has been pledged by these same people and will be made available when needed. The establishment of these clubs is to be a function of the presently organized National Aviation Education Council (NAEC) to which the money has been turned over. The first order of business is to buy the land and construct the Aero Club Facility in Washington, D. C. The primary objectives of this club will be to serve first of all the promotion of aviation education among the youth of our country. Secondly, it will provide a social meeting place for our NAEC, NAA, CAP, etc.

As to the building itself, a site has been selected and options taken on the land next door to the Statler Hotel in Washington and a builder and architect have already been selected and they are working together toward an opening date for the National Aero Club in December 1956.

Meanwhile, NAA is seeking more and more members for its own organization to give an ever expanding base of support to its aviation education and other programs. Meanwhile, NAA pledges itself to do whatever it can to help you become more and more effective in the cause which we believe.

For those of us who believe that aviation is a keystone of both our national economy and our national security, we have not yet done our job nearly as thoroughly as any of us know is required.

For even though we Americans first invented powered flight, and even though we turned back two dictatorships in World War II with military power — the facts still remain that:

(1) Over a hundred million Americans have never been in an airplane,

(2) Less and less young men each year interest themselves in aviation engineering as a career. (While in Soviet Russia, more and more aviation engineers are graduated every year). It is sad, but true, that each year fewer and fewer college men voluntarily choose to render their military service as fliers in the Air Force.

These trends away from a maximum use of aviation for America's commercial benefits and for its national security, by the very nation which created powered flight, are disturbing and they must be altered, if we are to hold our place of leadership in the free world's fight against the aggression of communism.

I believe these trends might be turned to our country's favor by education. The more millions of Americans who understand aviation from the time they are children, the more inclined we will be as a people to use aviation correctly to improve our own and the rest of the world's standard of living — the closer will be our communication with each other and the rest of the world —

and the better we know each other and the rest of the world through aviation, the better our chances of living at peace in this world of troubles. For many of the world's troubles are the result of ignorance. Ignorance which might be overcome. At least in part by aviation education — aviation education accomplished by you, the teachers of our American citizens and leaders of tomorrow.

The story of my life as indicated so many times in my book leads from no shoes (as a refugee from Sawdust Road, which is located in the South close by Tobacco Road of theatre and movie fame) to the Diamond Horseshoe at the Metropolitan Opera House. It is somewhat parallel to the story of the role women have played in aviation. I have had a life of ups and downs and contrasts, with plenty of valleys.

What I have done without special advantages, others can also do. I hear far too much about the desire for security. I do not believe there is such a thing as financial security — at least with satisfaction. Certainly it does not come from a private pension fund or a government's promise of poor bed and board after most of life has been spent idling around waiting for such a payoff.

My message to America's youth is to flex your mental muscles and get cracking under your own power. Derive emotional satisfaction from a good try and then another and another and still another if the first ones fail. In the case of an airplane, speed is determined by the outcome of the conflict between thrust of the power and drag of the plane. So it also is with humans. If you will open up your power plants of vitality and energy, clean up your spark plugs of ambition and desires, and pour in the fuel of work and still more work, you will be likely to go places and do things.

The formula for success has many components. There is never precisely the same mixture. A drop of luck can substitute for a dash of opportunity, but in every well-blended recipe for success will be found, in addition to honesty and as main ingredients, determination and tenacity and a substantial portion of skill and experience which come with the trying. There will also be found imagination and faith which bring the other elements together as a potent whole.

This land of ours still has its Sawdust Roads and Tobacco Roads that I knew in my childhood. And it will always have these places because some people prefer to live that way rather than to work. But I have seen most of the rest of the world, and the poorest one third of our people live in abundance compared to the top one third of most of the other peoples of the world.

What we have here in the United States, good, bad and mediocre taken into account, is the best the world has ever known.

Let's not let it be pulled down — either by carelessness, indifference or idleness.

The Expanding Rôle *of the* Smithsonian Institute *in* Aviation *and* Education

By DR. LEONARD CARMICHAEL
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Washington 25, D. C.
and
PAUL E. GARBER
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OVER a hundred years ago, Joseph Henry, the first Secretary of the Smithsonian Institution, wrote, "The worth and importance of the Institution are not to be estimated by what it accumulates within the walls of its building, but by what it sends forth to the world." This statement continues to be true. The old Smithsonian Building of Henry's time has been joined by many others—two museums, three art galleries, the National Zoological Park, and four other bureaus of our government, each one performing its individual research and educational service.

Aeronautics is one of the youngest but also one of the most vigorous fields that is represented in the Smithsonian. The Institution's collections contain many famous aircraft and related objects. These specimens have been chosen for preservation because of their historic prominence, technical significance, biographical association, or economic importance. Some, such as the Wright Brothers' original *Kitty Hawk* Flyer of 1903, Lindberg's *Spirit of St. Louis*, and Wiley Post's *Winnie Mae*, combine all four requisites for museum preservation. All the objects in the collection embody an educational and research significance which is increasingly apparent.

In 1953, the aeronautical fraternity marked a half century of progress since the Wright Brothers first accomplished successful human flight in a powered and controlled heavier-than-air craft at Kity Hawk, North Carolina, December 17, 1903. Without interrupting the thrust of its new jet engines, aeronautics looked back over its shoulder to take stock of fifty years of advancement, then looked forward to plan for the future.

To insure the realization of such programs there must be maintained a constant flow of able young workers to the laboratories, factories, and airfields of tomorrow. The air leaders of today who have brought our nation to its eminence in aeronautics must depend upon America's educational institutions to keep up that flow. It has been said that America's air might cannot maintain its forward flight without a flow of knowledge from its fuel tanks. As they contemplate this great responsibility, America's educators can depend upon the Smithsonian Institution's National

Air Museum to help in both the instruction and the inspiration of the aeronautical scientists, engineers, pilots, and workers of the future.

The utility of our collection of aeronautical memorabilia is emphasized in the citation awarded in 1949 by the Air Force Association to the Smithsonian Institution "for its foresight in establishing the National Air Museum and thus contributing to a better understanding of Airpower as a vital part of our national culture . . . ." This citation reads in part:

> "The machines man has developed and discarded in his long struggle with the unknowns of aviation, from his first feeble efforts to achieve flight to his supersonic exploration of the dawning Air Age, serve as laboratories for further advancement of aeronautical science. They fire man's imagination toward greater heights, greater speeds, greater distances.
>
> "The Smithsonian Institution has long seen the value in preserving the man-made milestone in aviation progress. Its collection of aeronautical items for museum purposes was underway a full generation before the first flight of the Wright Brothers.
>
> "The National Air Museum of Smithsonian Institution is an outgrowth of that early interest in aviation. This Air Museum, with its valuable collection of aircraft and equipment, memorializes the national development of aviation and acts as a repository for scientific equipment and data of aeronautical significance."

The second paragraph of this citation may be a surprise to some who think of the Smithsonian's aeronautical collection as of recent origin. The Institution itself can trace its beginning to the first half of the previous century. It was in 1826 that James Smithson of England, a descendant of old and aristocratic families, was contemplating how he, in failing health, could best dispose of his fortune. Somehow he had become sympathetic to the needs of the young American nation and so he wrote in his will, "I bequeath the whole of my property . . . to the United States of America, to found at Washington, under the name of the Smithsonian Institution, an Establishment for the increase and diffusion of knowledge among men." For more than a century this Institution has carried out the will of its founder by increasing knowledge through explorations, research, and the collection of significant objects. It has diffused knowledge by exhibitions, lectures, and especially by thousands of important publications.

In referring to the origin of aeronautics at the Smithsonian Institution, it is of interest to note that James Smithson, himself a good chemist, corresponded with two of the most prominent aeronauts of that day, Joseph Gay-Lussac and J. B. Biot. He undoubtedly was interested in their famous high-altitude balloon ascents in 1804, when they investigated the effects of magnetism aloft and the composition of the upper air.

Professor Henry, already referred to as the first Secretary of the Smithsonian Institution, was a close associate of the famous American balloonist Thaddeus Lowe and assisted him in introducing the use of balloons as a military accessory of the Northern armies during the Civil War. Samuel Pierpont Langley became Secretary of the Smithsonian in 1887, and brought to the Institution a very active interest in aeronautics.

His prominence in the scientific world gave dignity to the science of mechanical flight which was then generally considered to be only amusing or at least in the province of dreamers. A number of experimenters interested in flight came to consult with him, bringing models of their ideas and seeking his advice. Langley's realization that these and other devices should be preserved is reflected in the Annual Report of the United States National Museum of 1889: "It is intended to establish in the Museum a Department of Aeronautics, in which will be established (1) balloons and apparatus lighter than air, and (2) models of aerostats heavier than air. The co-operation of the Aeronautical Society of Great Britain has been invited by the Secretary of the Institution, who is especially interested in the subject."

In 1889, the first accession record of an aeronautical object was entered in the Smithsonian files. This was for the Prize Engine of John Stringfellow of England who, in 1848, had been the first to demonstrate dynamic flight with an unmanned model. Twenty years later he had entered one of his small steam engines in the first aeronautical exposition and had been awarded first prize because it was the lightest in proportion to its power, estimated by him at about one horsepower. Other accessions soon followed, and later a great collection of Chinese kites was added—a very logical, basic exhibit, because kites were the first form of aircraft devised by man. The Smithsonian's collection is naturally very rich in examples of Langley's work and includes some of his experimental apparatus, several of his large models, and his "Aerodrome A" of 1903.

In addition to the *Kitty Hawk* Flyer, there are two other Wright Brothers' airplanes in the Smithsonian: the first military flyer of 1909, and the first transcontinental flier, which, piloted by the intrepid Calbraith Perry Rodgers, made the coast-to-coast journey across the United States in eighty-four days in 1911. Other aircraft of the "Early Birds" include those of Curtiss, Benoist, Fowler, Martin, Baldwin, Bleriot, and Wiseman. The first World War is illustrated by twelve planes, including a Spad XIII, which was flown by three of America's great aces to achieve seven victories, a German Fokker D-7 heroically captured by pilots of our First Pursuit Squadron, and General William Mitchell's flagplane.

The years following World War I, extending into the mid-1930's, have appropriately been called "The Golden Age of Aviation." They included the first flights across the Atlantic and around the world; the first nonstop transcontinental flight; the exploits of Charles Lindbergh, Wiley Post, James Doolittle, Richard Byrd, Lincoln Ellsworth, Frank Hawkes, and Al Williams; the marvelous flight through Central America and around South America to the West Indies and return to the United States by the Loening Amphibian aircraft of the Pan American Good Will Squadron; and the record altitude ascent of Captain Albert Stevens and Orvil Anderson. With the exception of Byrd's polar airplanes, all these aircraft are in the national aeronautical collection.

The foundation of commercial aeronautics was the development of air mail. Several exhibits in the National Air Museum recall the stirring days of the postal pioneers which were followed by

the advent of the Boeing 80, the Fort-Stout air transport, the Boeing 247-D, and the Douglas DC-3. Several early passenger planes are in the Smithsonian collection; others are being held for later delivery. The Smithsonian collection also includes gliders, rotocraft, lighter-than-air craft, and racing planes.

The means for housing the national aeronautical exhibit have been limited to a prefabricated hanger built during World War I on the grounds of the Smithsonian on the Mall in Washington, and to suspensions in the halls of the adjacent Arts and Industries Building, which was erected in 1879. At the advent of World War II no room was available for new exhibitions, but at the war's close General of the Air Force H. H. Arnold was convinced that significant aircraft of that war must be preserved. When his original idea for an Air Force Museum was proposed to Congress it was expanded through the authorship of the Honorable Jennings Randolph into a Bill for a National Air Museum. The Bill became law on August 12, 1946, establishing this new Museum as one of the ten bureaus of the Smithsonian Institution.

With the Smithsonian's aircraft collection as a nucleus, there was transferred to this new bureau a large collection of warplanes, assembled by the direction of General Arnold, and a number of important planes acquired by the Navy. Airlines, aeronautical organizations, and individual collectors added many of their treasures. Recent accessions have included America's first jet-powered airplane, the Bell XP-59A; the world's first supersonic airplane, the Bell X-1; Captain Charles Blair's *Excalibur-III*, the first solo nonstop trans-North Polar airplane; the world record distance flyer, the Navy's *Truculent Turtle;* Bill Odom's record nonstop solo Beechcraft, *Waikiki Beech;* Steve Whitman's racing plane, *Buster;* and one of the first Link Trainers developed in 1929.

A selection of guided missiles is now being acquired by the Smithsonian. The Museum's collection also includes numerous important engines, instruments, trophies, and personal mementos of noted flyers, designers, engineers, and others who have been responsible for the development and romance of the Air Age.

Lack of space at present limits the display to less than a fourth of these historically and scientifically important aircraft. Principal projects of the staff of the National Air Museum, therefore, must now be the preservation in storage of bulk collections and the planning of a future adequate building. A firm of architects is now developing plans for an impressive and useful structure intended for erection near the older Smithsonian buildings in Washington, D. C. With the completion of these plans the Institution will be able to report on proposed construction details and estimated costs.

As already pointed out, the Smithsonian's aircraft collections are informative and interesting to future students of all aspects of aviation. The two buildings housing aircraft are visited every year by millions of individuals including hundreds of thousands of school children. Here they are impressed and inspired by man's audacity and genius. There is no admission charge, and the buildings are open every day except Christmas. Each exhibit is labeled, and the student desiring additional information may consult mem-

bers of the Museum staff, who will answer specific questions, and, if the visitor's time permits, will suggest to him pertinent books, magazines, and reference files. These files date back to the very beginning of the aeronautical collection and have been increased through the years by the addition of catalogues, clippings, photographs, technical papers, and related texts.

Many collectors of aeronautics, aware of the great service value of a national fund of information, have shared their collections with the Museum, permitting photographic copies to be made of their materials, or have given outright the results of their own research on air history. One of these donors recently wrote to the Museum stating that his own collection had been wiped out by fire and that he was grateful that copies had been preserved at the Smithsonian. Large collections of factual material have been acquired by the Museum through gifts or bequests. When a donor wishes to retain commercial rights for reproduction, the staff respects them and inquiries about such material are referred to the donor. On this basis a number of commercial firms have sent reference material to the Museum, and they thus added to the national repository of aeronautical information but kept their own interest in it.

The Smithsonian Institution has amassed thousands of negatives and photographs illustrating noted aircraft and related subjects. When these are not restricted, prints are available to the public at cost. Most subjects are supplied in the 8″ x 10″ size for a charge of 75 cents each.

Lists of some groupings of aircraft subjects are available.

Although persons seeking aeronautical information can best appreciate the facilities of the National Air Museum by a visit to the exhibits and offices, a great deal of contact with interested educators and other people is conducted by correspondence. Much of the reference material is filed for ready access. Limited funds have kept the staff small, but when it becomes possible to expand the Museum to dimensions commensurate with the extent and value of its specimens and services, the ability to serve the public will be crrespondingly increased.

Films and slides of aeronautical subjects and events are included in the Museum's material for the diffusion of knowledge. This public-service function has been extended to the giving of lectures in schools and to groups of interested citizens as well as to experts.

Several publications dealing with the history of aeronautics have been issued by the Smithsonian. Others are in preparation. Articles on aeronautics have often been included in the Annual Reports of the Smithsonian. Separate editions of these papers have usually been made. The oldest printings are no longer in stock, but copies of many of them have been deposited in libraries throughout the nation and, by means of the Smithsonian's century-old International Exchange Service, throughout the world. About 15 titles remain in sufficient supply for issue. A list of these will be sent on request.

The "Handbook of the National Aeronautical Collection" was first compiled in 1927. Subsequent editions have been printed to keep up with advances in knowledge and the expansion of the collections. This handbook describes the principal specimens and their

relation to the history of aeronautics. The ninth editon will soon be ready.

A "Brief Guide to the Smithsonian Institution" is now available for 15 cents a copy. This booklet assists a visitor during his tour of the Smithsonian Institution and describes the principal displays including aircraft.

A grant from the Link Foundation recently assisted in the publication of a booklet, "Masters of the Air." It describes some of the brightest highlights in man's conquest of flight, beginning with the Lilienthal glider of 1894 and progressing to flight faster than the speed of sound. It tells the stories of a number of famous aircraft in the Smithsonian aeronautical collections. "Masters of the Air" includes maps showing the air routes of many celebrated flights and brief biographies of renowned aviation pioneers. It also suggests activities for students. It is a 32-page publication, with over 50 illustrations, and sells for 50 cents, postpaid.

A catalogue of the aircraft in the National Air Museum of the Smithsonian Institution is in preparation. It will illustrate each aircraft included in the collection and give a brief description of each exhibit.[1]

The Smithsonian Institution is proud of its origin, its traditions, and its services to mankind, which extend over a period of 109 years, since September 7, 1846, when its Board of Regents held its first meeting. Often, when a request is received for information, the member of the staff, in contributing his knowledge to help another research worker, wonders about the results that may come from such assistance. Sometimes the request may be in a childish scrawl on a postcard, or on the stationery of a business firm, or from some remote worker in a distant land. One of the most interesting letters, dealing with a request from an aeronautical student, was addressed to the Smithsonian Institution in 1899. It began: "I have been interested in the problem of mechanical and human flight ever since as a boy I constructed a number of bats that was his name for a model airplane of various sizes . . . . My observations since have only convinced me more firmly that human flight is possible and practicable. It is only a question of knowledge and skill just as in all acrobatic feats . . . . I believe that simple flight at least is possible to man and that the experiments and investigations of a large number of independent workers will result in the accumulation of information and knowledge and skill which will finally lead to accomplished flight . . . . I wish to avail myself of all that is already known and then if possible add my mite to help on the future worker who will attain final success." The letter included a request for " . . .such papers as the Smithsonian Institution has published on this subject and if possible a list of other works in print in the English language." He was sent pamphlets describing the experiments of Mouillard, Lilienthal, Huffaker, and Langley, and was recommended to read books compiled by Octave Chanute and James Means. In reply he acknowledged receipt of this information with his thanks. The person who sent that letter was Wilbur Wright. This is but one of many examples showing that the Smithsonian Institution not only records the history of aviation but also plays its part in making that history.

1. When this is available an announcement will be issued by the Editorial and Publications Division of the Smithsonian Institution, Washington 25, D. C., to whom all inquiries about available printed material should be addressed.

Education *for* Air Age Citizenship: *The* Air Force ROTC

By MAJOR GENERAL M. K. DEICHELMANN
Commandant, AFROTC
81 Commerce Street, Montgomery, Alabama

THE world was a big place a few years ago. London was a long way from New York, Japan was quite a distance from San Francisco, and Moscow was weeks away from Washington, D. C. Today, they are closer together. True, they are still the same number of *miles apart*. But the measurement of distances in miles has been practically obsolete for years. When you buy a train ticket do you inquire how long your trip will be in miles? Certainly not. You ask, "When will I get there?" And does the porter come through calling, "Five miles to Smithburg?" No. Who cares how many miles? He calls, "Ten minutes to Smithburg."

When we take a realistic attitude toward distances we must agree that our allies and our potential enemies *are actually closer to us* than ever before. Ideas and ideologies which used to be far enough away to ignore have now been brought into a juxtaposition which compels the kind of attention exemplified by the contents of this issue of *Education*, and which has sparked a general increase of interest in the Air Force Reserve Officers Training Corps.

The AFROTC has been in a constant state of change in the past few years: It has even outgrown its name.

At one time, the ROTC existed solely to develop a corps of reserve officers who could be called upon in time of national emergency. But the world situation has changed. Today, we must have planes actually sitting, with guns loaded, at the end of the runway; trained men actually dressed for flight, standing by, alert to take off instantly at the sound of a bell.

The AFROTC now supplies 80 percent of the active duty officers for this tensely ready Air Force. To select, motivate and educate these men is the first objective—or as we say in military language, is the primary mission—of AFROTC.

There are several advantages to having an officer procurement-education program on the college campus. This arrangement automatically provides some screening. That is, because the average college student is above the national average for his age in intelligence and ambition, the Air Force saves considerable time, effort, and expense in screening out unsuitable candidates.

Second, our location on the campus permits us to compete more successfully with the businesses and industries who are also making efforts to capture the interest of the college graduate.

Third, it maintains the tradition of the military service as a career parallel to the other professional careers for which students prepare in college.

Fourth, it provides continuous con-

tact between our course and the tremendous intellectual resources of the country's great institutions, and puts their libraries, their traditions, and their brain-power within reach of the cadet and his military instructor. The close and amiable relations that AFROTC has had with the faculties and administrations of its host institutions and with the academic societies and associations which represent higher education has had a profound influence on our course —an influence we are proud to recognize.

Fifth, and perhaps most important, on the campus the AFROTC course is in its proper environment as higher education. It is no longer enough for an Air Force officer to be trained, he must be educated. A system of officer procurement such as AFROTC permits the college student his own choice of major course—Engineering, English, History, Political Science or whatever it may be —and allows him to take his degree in it. His concurrent studies in the Department of Air Science are, therefore, placed in and contribute to his total education. He sees air power in the context of his other studies. He also sees his other studies in an Air Age context.

If our only mission were the procurement of educated officers, our course might be slightly different than it is. I say *might* be, because I am not at all sure it would differ very much even if our second mission were eliminated. This second (but not at all secondary) mission arises from the fact that many of our students take only the first two years of our four-year course.

There are many reasons for this. At many institutions, two years of basic Army, Navy, or Air Force ROTC are compulsory, but the advanced course is entirely voluntary and admission must be applied for. In order to enter the advanced course, the student must have maintained a relatively high academic grade level in all his college studies, must pass the Air Force Officer Qualification Test, and be selected by his ROTC instructors as having the characteristics desired in an officer.

So, for these and several other reasons, we have many more students taking the basic course than the advanced. It seemed to us that this fact should have considerable influence on the way we organized that basic curriculum and our thinking went something like this: One thing the future Air Force officer and the future civilian *both* need is an education that will equip them to be competent, informed citizens of this Air Age. We took this as the guiding principle of our basic course and developed a curriculum plan designed to create an awareness of the full potential of air power, its place in the national defense picture, and the impact of modern air power on world, national, and community affairs.

We then submitted this plan to several committees of Air Force officers, college presidents, deans, and professors of engineering, geography, political science, psychology and the communication skills. We considered carefully all the comments and criticisms of these people and designed the course that is now being taught in Air Force ROTC detachments in 188 Universities and Colleges all over the country.

The astonishing rapidity with which the airplane develops has two major implications for the Air Force. First, since the Air Force and its operations are all built around the airplane, every

improvement and every modification requires a corresponding improvement or modification in the training, organization, or method of operation of the Air Force itself. A modern Air Force is difficult to describe, because by the time one describes it as being such and so, it has already progressed to something else. This fluidity determines to a considerable degree the kind of men we must have as officers.

The second implication of this rapid development is related to the necessity for keeping the American citizen informed about developments in civil and military air operations and the capabilities of aircraft—our own and those of our enemies.

So much of what takes place in the world today, in our nation, in our city, even in our neighborhood, is directly or indirectly related to modern aviation, or is influenced by the capabilities of modern aviation, or is possible only because of it, that every citizen of a free nation has an inescapable responsibility to be and keep informed about its development.

The basic AFROTC course is meant to help the future citizen to fulfill that responsibility.

When I speak of modern aviation, I of course include our Air Force. I also include the Air Forces of our allies and those of our enemies. And when I speak of an Air Force, I speak of weapons systems. Included in weapons systems are nuclear weapons, large and small. These weapons are part and parcel of modern aviation and contribute heavily to aviation's influence on the business of the world.

So, the basic course begins with *Introduction to Aviation,* a unit designed to arouse interest in the airplane, to acquaint the student with the general field of aviation past and present, and with the airplane itself. The cadet learns the basic principles of flight, and enough about aircraft engines to appreciate their complexity, their capabilities, and their limitations.

Once he is acquainted with the airplane, he moves on to a brief study of the *Fundamentals of Global Geography.* Here, he is introduced to Air-Age concepts of space and distance, and to geography as seen from the airplane. He is exposed to modern ideas about the bearing of geographic factors on national power and policy; to weather and climate as elements of aviation geography; and to population, mineral resources, industrial potential, and so on, as contributors to national strength.

He is then ready to progress to a study of *International Tensions and Security Organizations,* in which he becomes acquainted with current international conditions and with the organizations (The League of Nations, United Nations, NATO, etc.) which have been established to provide mutual security and to maintain peace. What he learned of global geography is put to use here as he examines the nature of the forces of nationalism and national morality, and the military strength of the Soviet Union and its Satellites as compared to that of the Anti-Soviet and neutral nations.

The freshman course ends with *The Military Instrument of National Security.* The cadet comes to understand certain facts about the foreign policy of the United States and its allies as compared to that of the USSR. He becomes acquainted with the organization of the Army, the Navy, and the Air Force, and learns why they were unified. He

is introduced to the principles of war and the use of air power in war and as a preserver of peace.

The second year is more directly concerned with military aviation and aerial warfare. However, the instruction on weapons, aircraft, air operations and so on, is confined to those elementary and general principles and facts with which *every* citizen should be acquainted. It is information he must have to make intelligent appraisals and competent evaluations of the questions of national defense that he must constantly consider and reconsider if he is to fulfill his responsibilities as a citizen of a free nation.

The orientation of the final two years is frankly military, for the cadet in this advanced course has already chosen to obtain a commission in the Air Force. In most cases he has also indicated a desire for pilot or other aircrew training after graduation, and will contract to remain in the military service for three or four years. Some, of course, will make their careers in the Air Force.

The units which make up these two years can be only briefly described here. The contents listed are not complete, but representative.

The Air Force Commander and his Staff. The meaning of command, its responsibilities, authority and functions. Principles of staff organization and operation.

Creative-Problem Solving. The use of sound logic and of imagination in solving Air Force problems.

Communicating in the Air Force. The nature of and barriers to communications; observation, listening and reading as learning techniques; Air Force writing; effective speaking.

Instructing in the Air Force. Principles of learning; planning; methods of instruction; instructional aids; evaluation.

The Military Justice System.

Air Navigation and Weather.

Air Force Base Functions. Typical base organization; duties of key base officers, such as the Commander, Adjutant, Chaplain, Provost Marshall, Legal Officer, etc.

Leadership and Management Seminar. Leadership concepts and Theory; requirements of a good leader; the chain of command; human relations aspects of leadership-command; problem solving in leadership situations.

Military Aviation and the Evolution of Warfare. Principles of and evolution of techniques of war; basic traditional combat maneuvers; the history and development of modern air warfare —capabilities, tactics, strategy, policy and doctrine.

Military Aspects of World Political Geography. The structure of political power; strategic area; problems in world security in relation to international power, security through armed strength, economic strength, moral strength.

Throughout the four-year course, the cadet attends a Leadership Laboratory (30 hours per academic year) in which he learns the proper wearing of the uniform, military customs and courtesy, and basic military training including drill. The advanced cadets are the ranking officers in the Cadet Corps. They plan and operate these activities themselves, receiving valuable experience in planning, management, and instruction.

Though it is not part of the college curriculum, the Summer Training Unit is an integral part of the AFROTC program. These units are always located

on actual Air Force bases to which the advanced cadets go for about a month during the summer after their Junior year. There, they experience life on an air base, learn how the Air Force actually operates, talk to officers on active duty, accompany them as they perform their duties, and become familiar with operational aircraft.

On campus the cadet wears his uniform only one or two days a week; he is one hour a cadet, and the next hour a student of biology, a tenor in the college glee club, or the captain of the varsity debate team. The Summer Training Unit is the cadet's first experience with an uninterrupted military atmosphere for, it should be remembered, his AFROTC duties on the campus are only part-time. With few exceptions, he returns for his Senior year with greater enthusiasm and more intense application to his AFROTC studies than before.

Such is the course in Air Force ROTC in outline. It is unfortunate that such a brief description must neglect the all-important aspects of instruction methods, evaluation, in-service education for instructors, and so on. May I assure you, however, that should you wish to know more, the Professor of Air Science at the college or university near you will be more than pleased to have you show an interest. He will be delighted to discuss any aspect of the program with you and will be grateful for your criticism, suggestions and comments. We have never failed to profit from such visits and I may even suggest that you, too, will find it interesting and perhaps instructive. We want you to know what we are doing, and we want to know what you — as an educator and as a citizen — think of it.

BOOK REVIEWS

A History of Mechanical Inventions. By Abbott Payson Usher. Cambridge. Harvard University Press. 1955. $9.00 xi and 450 pages

Usher's *A History of Mechanical Inventions* has achieved the stature of a classic in the history of technology since its first appearance in 1929. This revised edition will make the work an even more important study in the realm of the cultural development of western civilization. Much new material has been added and extensive revisions have been made in several of the chapters. Usher presents entirely new material in the first four chapters in which he develops a theory of invention based on *Gestalt* psychology and in which he presents the concept of social evolution as continuous development from antiquity to the present day. A work to be treasured by all who are concerned with the evolution of industry and its impact on life and thought.—WILLIAM P. SEARS, New York University

Principles of Secondary Education. By Rudyard K. Bent and Henry Kronenberg. N. Y. McGraw-Hill. 1955. $5.50 xiii and 542 pages.

A complete view of American secondary education is presented in this new third edition of "Bent-and-Kronenberg." The book has been quite thoroughly revised and brought up to the minute. In presenting secondary education, the authors state its aims and purposes, its curriculum and students, and its functions and problems. The authors discuss current educational practices and quite fairly describe unresolved problems that face the secondary schools of the United States. A well-written, and comprehensive text on the subject.—WILLIAM P. SEARS

Aviation Education *and the* School Administrator

By COL. JORDAN L. LARSON, USAFR
Superintendent of Schools
Mount Vernon, New York

AS A school superintendent who is deeply interested in keeping abreast of the times in the scope and content of the educational program in our elementary and secondary schools, I am concerned about the growing importance of aviation education and what we need to do about it. Surely we are lagging far behind in that part of general education which not only affects the lives of all our people but which is bringing about changes in our ways of living more rapidly than in any period in the history of man.

Our rôle as administrators is to speed up the wheels of progress in our schools and to stimulate our teachers through whatever means we have at our disposal to teach the impact of aviation on our economic, political and social way of life both through integration within the various areas of the curriculum and through supplementary materials or special units wherever appropriate and feasible. Such information should cover the broadest aspects about aviation together with how and in what ways it has changed the living habits in the world of today. Too much of the content of our textbooks and supplementary materials is geared to the world of yesterday, and too little emphasis is given to the effects of this new acceleration of speed in travel, in trade, in communication and in the relatively close proximity in which all of the people of the world live.

The effects of speed of transportation and its corollary by-products of trade and communication brought on by aviation need to be taught in science, in geography, in distribution of economic products, in socio-political problems and in almost every aspect of human life and human relations. An example of one of these areas may bring out ideas covering many others. Last August, at the National Aviation Education Workshop, conducted by Civil Air Patrol (CAP) for several hundred teachers at the University of Colorado in Boulder, through arrangements made by several of the Hawaiian teachers in attendance and the courtesies and cooperation of two of our commercial airlines, some six hundred dinners were flown in from Hawaii, complete with all the native delicacies, and served to the members and guests of that Workshop. It seemed unbelievable. Yet there it was. Fresh flowers added to the beauty and fragrance of the occasion.

Apply this example to other things flown in daily from all parts of the world and we realize the extent of this relatively new media of travel and trade which has practically eliminated all barriers of land and sea which have blocked human progress and development throughout the ages. Teachers

can find new challenges in almost every area of education, from kindergarten through college.

Aviation in all of its aspects has brought about a need for a broader world outlook. We are just beginning to learn the nearness of our far off neighbors. No longer can we discuss the people of any country without reminding our young folks that they are within a day and a half of travel from us. In the days of the covered wagon a century ago that might have been only thirty miles. Today, it is anywhere in the world. The religious principle "Love thy neighbor as thyself" takes on new meanings for it reaches many more neighbors than ever before. We must be more interested in the political and economic welfare of the people of every country than we were a few years ago, since they are all neighbors in this air age of today. We must also learn that in order to love our country, it is not necessary to hate the rest of the world. To accomplish this we must add to our knowledge a better understanding of these other people.

Aviation has also brought us into closer proximity of new horizons and new frontiers. A little over a hundred years ago my grandparents came to this country from Norway in a sailing vessel. It took them eleven weeks, or seventy-seven days to reach Quebec, and they still had a long time to travel by boat and wagon to reach the middle west. Today, that same distance is traveled in about seven hours, or two hundred and sixty-four times faster.

Two years ago my wife and I had an opportunity to visit the land of my Nordic ancestors. Getting off the regular air route at Stavanger, we took a sea plane to Bergen. In this city regular sea plane taxis are available at reasonable rates, and we took off in a three place air taxi to fly over the snow capped mountains and down into Hardanger Fjord, tied the plane to a log, stepped out on the bank and soon were visiting my ancestral home. It seemed like a dream. Yet dreams of a few years ago are life's realities today because of mastery of the skies.

New frontiers of occupations have developed with the airplane. Fifty years ago half of the present occupations in this country did not exist. It is easy to believe that new jobs will increase one hundred per cent in the next twenty-five to fifty years. What a hopeful future and what new vistas are in store for our youth!

One of the most difficult problems to overcome in our schools is the lag in keeping pace with new ideas and new inventions in our educational program. The normal restraints brought about by traditional teaching operations and by delays in bringing textbooks and materials up-to-date act as a brake on educational progress. Research has indicated that it takes about fifty years to put through major changes of ideas in education. If this be true, we should make every effort to reduce this lag not only to less than twenty-five years, but to less than ten years. When we realize the rapid progress made in aviation since World War II, we know that we cannot be ten years behind concerning aviation materials.

All of this brings out the question of how we can speed up the process in education governing these great changes brought about through aviation. Considerable progress has been made during the last few years through Aviation Education Workshops. These should be

continued and expanded. From these Workshops teachers carry the message to many others and stimulate action by their fellow teachers. The schools must also cooperate with and utilize all available agencies interested in aviation education. These include the National Aviation Education Council; the Civil Air Patrol; the National Aeronautics Association; the Aircraft Industries Association; the Civil Aeronautics Administration; the Air Transport Association; the United States Air Force; the United States Office of Education; the American Council on Education; the American Association of School Administrators; colleges and universities and others.

Enthusiastic administrators should exchange their views with others about what they are doing in their schools in aviation education. It is more important to be doing something ourselves in our own schools, in our own educational groups, and elsewhere wherever we can, by special projects or by integration than to merely talk about it and "let George do it". Rather, we should be "George" and do it ourselves. Teachers and other interested persons should submit their ideas on aviation education to the local principal or superintendent. These ideas will be most welcome. Schools need also to collect and organize materials on aviation and to locate new sources of materials from magazines, travel folders, libraries and elsewhere.

Every great movement in business or industry has had a small beginning. This was true in the development and expansion of the use of steamships, railroads and automobiles. It is also true of airplanes. We should not then be too critical of our apparently slow progress in aviation education. Rather, we should find out just where we are and what we are doing. Then we should determine what we could and should be doing in aviation education and finally take action and do as much as we can.

In the words of Lincoln, "If we could first know where we are and whither we are going, we could better judge what to do and how to do it".

The Civil Air Patrol *and* Aviation Education

By MAJOR GENERAL LUCAS V. BEAU
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RECENTLY I was told of a guidance counselor who spoke to a group of very young school children. She told them of the many career opportunities of grown up people. At the end of her talk, she asked the children each to draw a picture illustrating what he or she would like to do when each became an adult. One little fellow drew a picture of a pilot. A little girl drew a picture of an air line hostess; another little girl handed the counselor a blank sheet of paper.

"What is this?" the counselor asked. "Don't you know what you want to do when you grow up?"

"Sure," replied the precocious urchin, "I want to get married, but I don't know how to draw a picture of it."

It seems to me that this story illustrates a condition pertaining to the relationship of the Civil Air Patrol and Aviation Education. The picture of the relationship between the two has not yet been clearly drawn. Perhaps the reason why no clear-cut definition has yet been made is similar to the reason for the dilemma of the little girl in the story. Perhaps those who attempted to describe this relationship were not in a position to see clearly all the ramifications of Aviation Education as it relates to Civil Air Patrol's general and specific objectives.

As a matter of fact, the many viewpoints from which attempts have been made to state the relationship of CAP and Aviation Education have obscured the true picture. You may recall the fable of the blind men who had occasion to observe an elephant. Since they were denied the privilege of viewing the beast in its entirety, each explored the best he could, exercising his sense of touch. The one who grasped the elephant's trunk argued that an elephant was like a snake. The one who grasped the tail insisted that it was like a rope. The blind man who encountered the side of the elephant was convinced that the elephant was like the side of a house, tall and wide; one of the men, the one who felt of the elephant's ear thereafter held the belief that an elephant was much like a rug; while the one who felt of the leg knew that an elephant was like a sturdy column that supports the roof on a portico. So it is when men argue without completely investigating, or when they are blind to any viewpoint except the one they hold.

What I should like to do quite briefly is to describe CAP's relationship to Aviation Education as I have observed it from many vantage points. First of all before undertaking to define relationships, I must speak briefly about the CAP and the youth movement it spon-

sors through its Cadet Program. The CAP has several objectives. However, all of these, not excepting the Cadet Program, were established for one and the same reason: To contribute as an Auxiliary to the USAF national security functions. CAP proved during World War II that many chores, exemplified by activities such as search and rescue, could be adequately done by civilian flyers. This is not the place to describe all the areas in which CAP serves the nation's welfare. It is the place to state that of all these services, the USAF places greatest emphasis upon the objectives of the cadet program.

It would be less than honest to say that a purpose was not to encourage young men to investigate the career opportunities that the U. S. Air Force offers. This most definitely is a purpose. However, the CAP cadet program is not a recruiting service. We would prefer to have one over-all purpose defined in terms of Aviation Education itself. This means then that Aviation Education must be carefully defined. When this is done, we discover that essentially the relationship that exists between the CAP and Aviation Education is a relationship of an organization to its purpose. For Aviation Education is generalized education in aviation, and a primary purpose of CAP is to encourage the development among its cadets and senior members of generally essential aviation understandings and attitudes. If this be true, one may ask, is not the CAP infringing upon the prerogatives of other agencies and institutions which also define their purposes as educational? Let us see.

Just now we defined Aviation Education as generalized education in aviation. Therefore, it is not concerned primarily with aviation skills nor professions. It is designed to help both youth and adult develop general aviation understandings — understandings basic not only to any or all aviation career areas, but also to successful living in an air age. One might ask, "Do the schools not have a responsibility toward successful living in an air age? And if this be the case, is not aviation education the concern of organized education rather than the concern of an auxiliary of the USAF?"

Of course the answer to this question depends upon how one defines education. We prefer to define education as the socially appropriate growth and development of an individual as manifest by his behavior. Now, unfortunately the experiences upon which this growth and development are based cannot be limited to the classroom.

In his autobiography, William Allen White had this to say, "The home, the barn, the river, and the school made this Willie White. The school only taught him superficial things — to read, write, and figure, and to take care of himself on the playground. But those other institutions of learning taught him wisdom, the rules of life, and the skills which had survival value in the world of boyhood."

Now, admittedly, the schools since Willie White's day have taken on added burden, but they still can influence the child or youth only about six hours of the 24 in a day. Neither does growth and development start when the youth enters the doors of his classroom and stop when he leaves the school house. It is continuous from the time he is ushered into the world until he reaches the portals of Heaven, and for all we know likely continues for a time there-

after. So the school must depend upon cooperating agencies. It is thusly that the several youth movements are defined — as cooperating agencies, agencies which never surplant, only supplement, the educational efforts of home and our excellent school system.

My people tell me that investigation bears out the protests of school administrators that it is difficult to find room in the curriculum of the secondary schools for new courses, even those which have survived value and I mean not in the world of William Allen White's boyhood, but survival value for democratic freedom in a harsh realistic world beset by international tensions and strife.

Some schools, however, are forward looking enough and have the facilities to conduct a program of aviation education on the secondary level. There are now over 200 communities throughout America in which there are high schools that offer a general education elective with the cooperation of Civil Air Patrol, but there are 1,000 cadet squadrons whose aviation education goes forward without the benefit of school cooperation. CAP's relationship to aviation education as typified by the schools' program is one of service; but in terms of CAP's own program, aviation education is a principal objective. In the one instance we seek to serve; in the other we seek service, for aviation education can be an aim of the programs of many groups, and each of these groups can profit by the support each gives the other.

The three National Aviation Education Workshops sponsored by Civil Air Patrol were an effort in teacher training to serve both its own program and that of the schools. But during the workshop, the cooperation of other agencies was forthcoming. Perhaps the greatest contribution was made by the USAF in terms of airlift and personnel; another contribution, and not the least, was made by airline and aviation industry representatives.

Many agencies and interests have found it necessary to supplement the educational program of schools, colleges, and university. The USAF is no exception. Should you desire to see a practical educational program founded on principles defined by the science of education, visit an air base and observe an airman training program in process. Such education is based on procedures that more traditional public schools have yet to adopt. Should the CAP be an exception, failing to serve the interests of its own program? Decidedly not, for its responsibilities require its people to be trained to do the jobs the USAF and the nation expect of them. Moreover and most important, basic essentials of Civil and Air Force aviation education and training in the main begins with the Civil Air Patrol cadet. The public schools are still in no position to assume this task completely even if one grants that they should.

Current research findings reveal that only a comparatively few exceptional teachers are able to enrich the content of course offerings by the use of aviation content, and that fewer still can successfully employ the techniques of the so-called "core" course at the secondary level. It has been reported that teachers keenly enthusiastic about aviation expect from their students interests as detailed as they themselves hold, and ignore problems of scope and sequence and the stage of maturity of the pupil or student. Too many speakers dealing

with aviation education exploit the sensational and ignore the professional education problems confronting the teacher concerned with aviation education.

Too many school administrators are perplexed by administrative problems — too many students per classroom, too few classrooms, and too few teachers. Why should we expect the impossible from these men and women? With few exceptions they have had little opportunity to become conversant with aviation's impacts. They have been told about the air age and the shrinking world; perhaps they have been over sold; but they have had little direct experience themselves with aviation's significant impacts.

The CAP joins forces whenever possible with those who would promote public school and community-wide interest and action in aviation education. However, convinced of the imperative need for youth education in this area, it looks upon its own program as its first responsibility.

The senior members of Civil Air Patrol realize the magnitude of its aviation youth movement. Steps are being taken to solve the curricular and instructional problems confronting it. For the education and training of its youth in aviation are both urgent and critical, and this education and training cannot continue unless the instructional aids employed are appropriate and those employing the materials of instruction are technically efficient.

There appears to be two principal avenues by which formalized direction can be given to youth development — be this in terms of aviation education, or other objectives such as those around which the Boy Scout movement is centered. One of these is the nation's public school systems; the other an organized and public supported youth movement. The Civil Air Patrol's cadet program fills this latter need insofar as aviation education is concerned. It does not supplant, rather it supplements the work schools should do to develop understandings, skills and attitudes in the field of aviation. Schools need the cooperative help and community support such a youth movement as the CAP cadet program provides.

Aviation Education, from the comprehensive CAP viewpoint, includes bringing adult leaders to a full realization of our country's need for aviation minded youth and adults. It includes recruiting the services of those among senior CAP members who take pleasure in sharing with young people the benefits of mature experiences. Aviation Education also includes informing senior members of the needs of their cadet program and how each can best serve these needs.

It has been mentioned that aviation education services includes those cooperative efforts made by all interested in advancing its cause. Excepting those programs of organized education, and that of its supplementary youth movement in aviation education by the Civil Air Patrol, *there are few programs centered around the aviation interests of young people!* Other aviation education programs of other groups can only be programs of service to schools or to an organized aviation youth movement.

This is because an aviation education program must be administered in terms of young people. The Civil Air Patrol is so administered and does reach American youth. It is designed to reach American youth. An Educational staff

member working with a cadet squadron *organization wise* is the key CAP member in a position to directly affect the aviation education development of a cadet in his squadron. In fact, we believe that the Civil Air Patrol is the squadron. We say, "If it doesn't happen in the squadron, then it simply isn't so." Civil Air Patrol members who work with cadets realize they are part of an *organization* whose end product is cadet aviation education.

Although in his capacity of squadron educational staff member, an individual makes his contribution to the objectives of the CAP cadet program, the area of his career employment may give him an opportunity to broaden his services to aviation education. This is especially true if he is employed as a teacher or instructor in school or college. In such an instance and in terms of his course offerings, he will find many opportunities to vitalize his subject matter by using the events of aviation.

Perhaps the best service that the CAP renders organized education stems from the concern of its Headquarters staff with the quality of the instructional materials used by Cadet squadrons and the type of guidance given its cadets. In the first instance a production program is under way. The revision of current materials and the production of new materials eventually will serve the aviation education objectives of both the Civil Air Patrol cadets and organized education. Each booklet and sound film strip produced, individually, will provide collateral reading material for use in related subject matter fields treated at the secondary school level. In toto, these booklets and complementary film strips will provide both squadrons and schools with the instructional materials basic to an elective general aviation education course.

A second significant area in which the CAP serves the school's program as well as its own is in the area of teacher education and orientation. The summer school workshops, which it has helped to organize and direct, serve two needs. One of these is the need of CAP for educational advisors at squadron level; the other, the need of the schools for instructors who know the complete aviation story.

A third significant area of service available to its own program and to schools is the consultation and advisory service of its Headquarters Aviation Education Staff. Aviation Education problems are in the main curriculum problems. The solution of such problems often requires the guidance of those with special training in appropriate educational fields.

In concluding let me repeat that the relationship of the Civil Air Patrol to Aviation Education is the relationship an organization holds toward the instrument with which it attains a purpose. This is certainly not a remote relationship. Instruments by definition, are the extensions of his own body employed so that an individual's objectives are more readily achieved. Consequently, a man is almost one with the tools he uses. For this reason the Civil Air Patrol in order to reach the goals of its cadet program could in no wise succeed without employing Aviation Education. This is the true relationship of CAP and Aviation Education.

Where others employ Aviation Education, as the schools of our country are beginning to do, obviously their goals are similar to those of the Civil Air Patrol's cadet program, and mutual

support is indicated. When other interests have support to offer well defined aviation education programs, this should be welcome.

But this we must remember. It is at the grass roots level — at the student-teacher level — that the most significant efforts of aviation education are made. CAP's aviation education program, a school's aviation education program cannot succeed unless efforts made at the grass roots bear fruit. All of the other things done anywhere exert only indirect influences. It is true that there are other things which must be done and done well. Both schools and CAP in their aviation education programs need all assistance available from any worthwhile source. There is a place for all who would serve aviation education. CAP itself stands ready to support and serve the aviation education program of school and college; but, its first and greatest concern is aviation education as both its goal and the process by which it helps American youth live zestfully today and successfully tomorrow.

BOOK REVIEW

Why Johnny Can't Read and What You Can Do about It. By Rudolf Flesch. New York: Harper and Brothers, 1955.

Rudolf Flesch, in his most recent book, *Why Johnny Can't Read and What You Can Do about It,*. has stepped out of his usual worthy mode of writing. In this volume, he has turned sharp, unfair critic in an area in which he is about as well qualified as Howard Whitman, who wrote the recent ill advised and offensive articles in Collier's Magazine, or Katherine Mayo, who after a brief tour of India wrote *Mother India,* posing as an authority on the customs of that country. Flesch's present volume is characterized by (1) statement after statement that reveal a lack of understanding of modern methods of teaching reading; (2) misinterpretation of quotations, out of context, of eminent authorities in the field of reading; and (3) statements based on many false assumptions.

The theme of Flesch's tirade is that the educators neither advocate nor employ the use of phonics in the teaching of reading and that, therefore, all parents should teach their offspring the phonetic elements at the age of five. This, he claims, will *insure* that all children will be able thereafter to read all printed materials.

Flesch claims, contrary to fact, that the teaching of sight words, and guessing, are the only methods of word attack taught today. He confounds the reader by claiming exclusive use of each of these methods: an utter impossibility. Had he examined the teacher's manuals or the brochures which accompany each of the several popular series of basal readers, he would have discovered that each author provides for the systematic presentation of the elements and principles of phonics and structural analysis. He would also have found that the number of sight words taught in the initial stages of reading usually varies within the limits of fifty to one hundred. Furthermore, he would have found emphasis on the interrelationship of different types of word recognition clues: namely, picture clues, configuration clues, phonetic clues, structural clues, and language rhythm clues.

Deliberately, or through inability to rightly interpret the viewpoints expressed in their publications, Flesch misconstrues or discounts as untrue the widely respected theories of the leading educators and psychologists in the field of reading. He implies that Betts, Gates and Gray are opposed to phonics as a word recognition skill, while he mentions the very books in which they, each in their own way, offer extensive suggestions for the development of phonetic skills. When he quotes Preston, he appears either to utterly ignore or else to fail to grasp this author's well taken point that reading is more than

(Continued on page 55)

The Story *of the* Link Foundation

By MISS MARILYN C. LINK
Executive Secretary, The Link Foundation
Smithsonian Institution
Washington 25, D. C.

"THE story behind The Link Foundation is really the story of Edwin A. Link." This statement appeared in an article written in a magazine of an international women's service organization and probably expresses better than any other words the background behind the establishment of The Link Foundation.

For those people who knew Ed Link as a high school youth, he probably seemed much like any other boy although his interests definitely bent towards the technical training subject areas rather than the classical. In 1920, public schools offering instruction in the technical-mechanical areas were few and far between so it wasn't long before Ed Link found himself going to vocational night school classes and purchasing books about electricity and the like for self-study.

Ed's interests soon took him to the airports and before the end of the 1920's, he was not only an accomplished flyer himself, but also the chief flight instructor and head of the Link Flying School in Binghampton, New York.

The Link Flying School needed more customers; however, the costs of flying at that time were too high for most of the enthusiastic prospective pilots. The genius of the man who is now Chairman of the Board of Link Aviation, Inc. went to work. Ed's first flight trainer materialized in 1929. With this ground-bound electrically operated machine called a "LINK PILOT MAKER", he could teach many of the necessary flight maneuvers just as efficiently as in the airplane, thereby saving some of the $20.00 per hour operation costs of actual airplane flight.

By using this "visual aid" as part of the Link method of flight instruction, the school advertised "learn to fly for $85.00" which was a revolutionary fee for those days.

To make a long story short (for the life work of any individual can not be adequately told in a few pages), Ed Link's contributions to the world were to be made for the most part in the field of aviation.

For now we know the Binghampton, N. Y. concern — Link Aviation, Inc. — the company which Ed founded and developed, has pioneered the idea of simulated flight training and produced such training devices as the Link Instrument Trainer, the Link Celestial Navigation Trainer, a Radar Trainer, a 1947 version of Ed's first "Primary Pilot Maker" called the "School Link", and a Bubble Sextant. Today, the company is building Jet Trainers and Simulators, aviation and navigation training aids and other electronic precision products. Under its present management and as a subsidiary of General Precision Equipment Corpora-

tion, Link Aviation, Inc. continues to grow, employing at present some 2,000 people.

Ed Link would be the first to tell you he couldn't have done the job alone. The help his older brother, George, gave him with his homework when they were boys and the efforts and assistance George provided in the days to follow when the Link companies[1] were developing, could not have been equalled by any other individual. Ed's knowledge gained by working in his father's organ factory in the early days helped give him ideas which he used in constructing his first Link Trainer. His wife, who worked for him through the depression days and after, understood his temperament, skills and determinations as she encouraged Ed constantly in his failures and successes. Last but not least, the many Link Company employees whose talents and efforts were added to Ed's, made it possible for him finally to establish The Link Foundation whereby through its grants to scientific and educational institutions, perhaps the youth of today and tomorrow may have an opportunity to receive the kind of assistance Ed Link lacked in his school days.

Therefore, if one knows the story of Edwin A. Link, the story of The Link Foundation may be more meaningful. The charter states the purposes of the Foundation are "to promote and advance scientific, technological, general educational and charitable projects."

However, when the Foundation was established in December 1953, Ed Link said: "Since I have devoted a major part of my life to furthering aeronautics through the development of training and educational aids, I am particularly interested in assisting those youths and adults who attempt to advance their knowledge in the field of aeronautics. For this reason, it is my desire that the Board of Trustees give special consideration in its gifts from the trust to projects which will further advance education and training in aeronautics."

Once again, Ed Link called upon help from others in order to do the best possible job; for although his interests and wishes were clarified, Ed concluded: "the responsibility for the administration of the Fund rests with the Trustees and will be carried out in their sole discretion."

The Board of Trustees through its Chairman, C. Addison Keeler, of the Binghamton, N. Y. law firm Hinman, Howard & Kattell, were instrumental in forming the basic operating plan of the Foundation. In addition to Mr. Keeler, the other Trustees responsible for the administration of the Fund are Trustee Secretary-Treasurer, Cornelius C. Van Patten, President of the Binghamton Savings Bank; Edgar W. Couper, President of the Binghamton First National Bank; Thomas A. Wilson, President of the Marine Midland Trust Company of Southern New York; and Bertram J. Miner, Executive Vice-President and Cashier of the First National Bank of Binghamton, N. Y.

In order to implement the purposes of the Foundation, a Technical Assistance Board was appointed whose primary responsibility is to review and develop projects to recommend to the Trustees for the granting of available monies. Individuals who have been appointed to the Board are outstanding

1. At present, there are three separate Link founded companies: Link Aviation, Inc., Binghamton, New York; Link Manufacturing Ltd., Gananoque, Ontario, Canada; Link Aeronautical Corp., Endicott, New York.

educators and administrators of aviation programs which have been recognized as the best developments of their kind. Technical Assistance Board members are Dr. Leslie A. Bryan, Director of the Institute of Aviation, University of Illinois; Dr. Leonard Carmichael, Secretary and Administrative Director of Smithsonian Institution; and Dr. Frank E. Sorenson, Chairman of the Department of Educational Services, University of Nebraska, and Administrator of the Nebraska Air Age Education Division.

Through the knowledge these men possess in the aviation and education fields and the administrative talents of the Board of Trustees, the Link Foundation Fund has started to grow. Contributors to the Foundation Fund know under the leadership of these groups, grants by the Foundation will be made wisely and purposefully and that applicants requesting assistance will receive the best possible consideration. The Board of Directors of Link Aviation, Inc. have approved two major contributions to the Foundation since its establishment, believing the Foundation can assist the educational institutions of our nation now and for many years to come, in the development of their programs.

As a guide in recommending and approving grants, a *Statement of Policy* was developed and is often sent to persons who wish to learn more about the purposes of the Link Foundation. The statement is reprinted here:

The primary purpose of the Link Foundation is to make grants available to institutions or associations properly qualified as non-profit educational and scientific entities engaged in one or more of the following projects:

1. Encouraging existing state agencies engaged in education and training to explore ways of enriching instruction through the use of Air Age ideas and materials.
2. Encouraging education and aviation agencies and industries at the community and state levels to pool their resources in advancing education and training in aeronautics.
3. Facilitating the flow of promising developments, including concepts, techniques, devices, and materials in aviation education to educational leaders about the nation.
4. Encouraging existing national agencies concerned with education and training to review and evaluate in conferences, seminars, and workshops the many aspects of Air Age Education and use their prestige and channels of communication to spread conclusions and recommendations.
5. Cooperating with the military and non-military aviation agencies of the United States Government as they advance education and training, thus contributing to national welfare and security.

Grants will be made by the Trustees in their sole discretion to applicants which the Trustees feel will most effectively carry out the purposes of the Foundation.

By reading the Policy Statement, it should be evident that the Link Foundation desires to complement the existing programs of educational and scientific organizations through making grants available to them, rather than to duplicate their efforts in any way. In some instances grants made by the Link Foundation have been used to expand existing programs or have assisted

recipients in carrying out a project which would not have been possible to do without the aid of outside funds. For example, one of the most recent grants went to the Amelia Earhart Scholarship Fund of Zonta International. This group (whose members are located in some 13 countries) gives one graduate aeronautical engineering scholarship each year to a selected woman student. The Link Foundation Grant will make possible a second scholarship award for the year.

Since the Foundation funds at the present time are limited, grants have necessarily been limited in number and amount. Therefore, most grants approved have been made to educational and scientific organizations which are recognized as outstanding leaders in their particular aviation education field, in order that they might share their program, ideas, and materials with others. The institutions and organizations which are recipients of Link Foundation grants use the funds received in accordance with the general information they have supplied on their applications.

As an additional step in furthering the general purpose of the Foundation — namely, "to advance education and training in aeronautics" — a Link Foundation Fellowship program has been established. Each year, three or more grants may be made annually to selected colleges or universities for the purpose of awarding fellowships to graduate students engaged in research in one of the following fields:

Aviation Education, Aviation Medicine, Aviation Psychology.

Additional pertinent facts about the Fellowship program are as follows:

ELIGIBILITY

Applicants for Link Foundation Fellowships should qualify as follows:

1. Meet all requirements for graduate study.

2. Engage in research in one of the three fields indicated.

STIPEND

The amount of the grant for a Link Foundation Fellowship shall be $1500.00. Receipt of this fellowship does not preclude other assistance.

COOPERATING INSTITUTIONS

Candidates interested and qualified are invited to communicate with:

(to be selected)

for the fellowship in *Aviation Education*

Ohio State University, Columbus, Ohio

for the fellowship in *Aviation Medicine*

Tufts College, Medford, Massachusetts

for the fellowship in

Aviation Psychology

APPLICATION

The office or offices responsible for graduate programs at the Institutions offering the fellowships will provide an application form upon request. Completed applications must be returned by March 1st and will be acted upon by April 1st. Candidates will be notified promptly.

REPORT

The recipients of Link Foundation Fellowships are requested to report or publish in a recognized journal or professional paper the results of their studies indicating the implications of their discoveries for the advancement of education and training in aeronautics.

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DEMONSTRATORS AND SPEAKERS: Nationally-known specialists in the language arts and child development include Dr. Matilda Bailey, Dr. Emmett A. Betts, Miss Dilys Jones, Dr. Ethel Maney, Mrs. Elizabeth Nemoy, Miss Ruth E. Oaks, Dr. Linda C. Smith, Miss Carolyn M. Welch, Mrs. Rosemary Green Wilson, Miss Josephine Wolfe, and others to be announced in the printed program.

HEADQUARTERS HOTEL: The Benjamin Franklin Hotel, Philadelphia, will be the official headquarters for the Institute. Since hotel facilities are at a premium, reservations should be made immediately. Information on hotel reservations will be included in advance registration materials.

ENROLLMENT: Since the enrollment is limited, *advance registration is required.* For a copy of the program, hotel reservations, and other Institute information, write:

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Air Age Geography: Yesterday, Today *and* Tomorrow

By DR. FRANK E. SORENSON*
University of Nebraska

THE 1955 Memphis meeting of the Association of American Geographers will long be remembered by those in attendance. My graduate students in Educational Geography returned to the University of Nebraska from the meeting filled with an exciting story. They had been stimulated in the political geography section headed by Dewent Whittlesey to think objectively concerning new frontiers in geography, frontiers established largely by the fantastic rôle aviation is playing today in local, national, and world affairs. They had been convinced by Alexander DeSeversky, Alexander Melamid, and others that a new style geography is emerging. In their opinion, the new geography might well be called "air age" geography.

Air Age Pioneers

This was a 1955 contact geographers had with aviation leaders. It reminded the writer of a somewhat similar awakening that was thrust upon him fourteen years earlier in a meeting held in the Nebraska Capitol Building in Lincoln. The Nebraska meeting was one of several conducted over the nation in an attempt to assist the Civil Aeronautics Administration and the United States Air Force in their determination to "air condition" young America, and thus guarantee for the United States aviation leadership and machines essential for the military and economic survival of our nation. Two dynamic and visionary speakers at this meeting were Dr. George Frazier of Greeley, Colorado State Teachers College and Dr. George Renner, Columbia University Teachers College. These men were indeed air age education pioneers. They painted word pictures of living about the world in the quarter of a century just ahead, a period in which aviation possibly more than any other force would influence political, economic, social, and military thought and action at home and abroad.

It has been interesting to observe the debate regarding the amount of support that our nation should give to aviation. This debate has gone on in schools, in the legislative chambers of state government, in the halls of Congress, and in the headquarters of the United Nations. As a result, aviation is another one of America's firsts. Already the United States Air Force is our first line of military defense. In addition, our civilian airplanes carry millions of passengers and huge quantities of express and freight from one domestic center to another and to consumers overseas. The military and the civilian air lanes around the world act like steel bands in a planned pattern to hold the nations together.

* Professor of Education, Lecturer in Geography, and Administrator, Nebraska Air Age Education Division.

New Geography Concepts Emerge

This emerging air age suggests a new type of thinking for geographers. The age-old barriers of land, mountains, forests, and oceans have been minimized and huge areas of the earth once isolated are now on the main highways of air transportation. The ocean of air, moreover, is filled with global air commerce and thus offers one of the new frontiers for geographic study. Here there are no political boundaries, shores, or gateways that can be controlled by the nations which happen to be in possession of them. The highways in the sky seem to belong to all nations and provide the necessary channels for the easy flow of goods, services, and ideas so closely identified with the good life for all. Without question the ocean of air with its global network of airways will contribute to the development of international understanding and world peace.

The geographer needs to be a participant in the air age. He is urged to use air travel as extensively as possible, he is encouraged to direct his investigations and his field trips so that aviation developments can become a part of his thinking and his actions. Such participation will cause him to recognize and appreciate the outmoded concept of speaking of distance in terms of geographical miles rather than distance in terms of time required to travel from one place to another.

He will discover that today the nations of the world are closer together than were the thirteen colonies in 1776, that no longer can people in one nation live in isolation, that the problems of all nations small or large very soon become the problems of America and the world. Witness America's interest in Korea and Formosa. Review the monumental United States plan to cooperate with the underdeveloped countries as they seek to solve the problems of poverty, disease, and ignorance.

Travel to Other Lands Encouraged

The air age offers many opportunities for the peoples of the world to visit their neighbors. In the first place, the airplane has cut the travel time to hours where it used to be days and even weeks. In addition, the cost of travel has been lowered to the place where it is well within the range of the working classes. Airline fares have dropped below first-class rail and steamship tickets in some instances. Another factor is the extensive number of new comfortable and safe airplanes now following regular global schedules. It is not unlikely that overseas air travel will continue to increase materially in the years ahead. This suggests that the traveling public will want to increase their knowledge of geography so that they can get the maximum benefits from their air excursions.

In some instances community groups are making tours to other countries. Several months ago, a party of eight Grand Island Nebraska citizens decided to visit Central and South America by air. In making plans for this trip a number of problems had to be solved. Their consultant was a geography trained representative of the airline on which they were to travel. He provided them with a map of their journey with a suggested timetable for the two months that they were to be enroute. He recommended that a minimum knowledge of Spanish be acquired. He assisted with arranging for passports that, in turn, called for certain protective health

measures. He suggested a clothing wardrobe for both men and women and indicated how to solve the money problem in each country. Most important of all, he provided the prospective travelers with geographic literature describing the lands and peoples to be visited. This service could hardly have been provided by an airline without a geography trained representative.

Now that the Grand Island travelers have returned to their community, Central and South America have come to life for many, many families. The travelers have become their neighbors' teachers. They emphasize in their discussions the great change that aviation is making in the lives of our neighbors to the south. They point out that the advance in technology and mass travel has focused attention on problems that seemed less important in the past. For example, what happens when people of various races, conflicting religions, and different languages are thrown together. Even more critical is the question of nations learning to live together who in the past have attempted to settle their differences through the avenue of war. The lesson for the geographer seems to include the idea that in the years ahead many, many Americans will visit their world neighbors and whatever geographic training can be provided for them as readiness for the trip will be highly appropriate.

Geography Classes for Travelers Favored

It is said that the American traveler is not always appreciated abroad. A few of the reasons given are listed here: (1) the U. S. citizen may assume an attitude of being superior to the citizens of other countries especially those with shades of skin darker than his own, (2) the traveler may expect the same facilities and services in hotels, cafes, stores, and in transportation vehicles that he is accustomed to in the United States, and (3) the visitor may not recognize the intelligent responses that the people in the host countries are making to their natural environments. If we wish to be accepted as neighbor and friend, let's approach each new country with some knowledge of its culture, particularly the way in which it has responded to its geographical and historical surroundings. Is it any wonder that some universities have substantial enrollments in geography classes for travelers and that the United States government has a special school for briefing government employees assigned to foreign service?

There is another reason why we must think of the United States as one member of the global community of nations. Each year thousands upon thousands of foreign business leaders, tourists, and students travel to the United States where they may stay several days or, in some instances, several years. The American universities and colleges serve as hosts to our friends from abroad. In these educational settings, foreign students are acquiring the knowledge, skills, and attitudes necessary to lead in development programs at home. It would seem that all university and college departments of geography would put forth every effort to interest foreign students in their classes. How better can an instructor supplement his knowledge of other countries than by drawing frequently on the knowledge and experience of these foreign guests.

The University of Nebraska ordinarily has about 175 foreign students enrolled. These students participate in the regular classes, share in the activi-

ties of the Nebraska University Council of World Affairs and make regular weekend visits to homes in Nebraska towns and farm communities. These foreign students are high in their praise of the informal educational contacts both on and off campus. Incidentally, these contacts contribute significantly to the foreign students' knowledge of the geography of the local area.

Overlooked Areas of the Earth Gain New Prominence

Certain areas of the earth's surface are gaining prominence in the air age. One area taking on new significance is that surrounding the North Pole. The United States and Canada are spending millions of dollars developing military air bases and other installations in the Arctic area. Why? Anyone familiar with planning air routes knows that they should follow in so far as possible great circles. Last November Scandinavian Airlines System cut several hours and over five hundred miles from the fastest flying time to Europe using Los Angeles as one terminal by flying over the polar area. Northwestern Airlines, moreover, uses the shortest route from our northwest cities to Japan which touches Kodiak, Alaska and the Aleutians. The story of the bush pilots in Alaska and Canada in itself indicates that the northland is a continuous center of aviation activity. In the years ahead, the cold Arctic lands and the ocean of air above may well be our first line of defense against a possible air attack.

Russia is also interested in the north polar area. Recently Pravda said a Russian "high latitude air expedition" was then operating in an arctic area 1,000 miles from the continental Soviet Union and 300 miles away from Canada's Ellesmere Island. According to the report, the Soviet airborne scientific mission is engaged in surveying the region. Russia will continue her explorations about the top of the earth because aviation will surely change this relatively inhospitable land into one of major economic and military significance.

In Canada as in the United States aviation has become one of the biggest industries. Aircraft and engine factories stand out in the outskirts of cities like Toronto and Montreal. Canada's biggest expense is its fast-growing Royal Canadian Air Force. Canada is joined with the United States in a plan to provide continental air defense. The two governments have placed a string of radar stations across the southern part of the country. Across the middle of the country, Canada is building still another radar fence. In time the United States will have another radar chain still farther north. These three radar systems extending across Canada are a part of the new air age geography. It seems reasonable to predict that, in the future, geography instruction will include an extensive survey of the Arctic area.

A second area gaining prominence because of the widespread use of the airplane can be thought of as the large number of scattered islands about the Atlantic and the Pacific. Islands of little importance in the age of train and ship travel now acquire new signficance. These islands are less remote than in the past and some find themselves on important airways. At island stopping places where airports grow to considerable size, it is not uncommon for one hundred or more families to accept these places as permanent homes. This means that complete vil-

lages must be constructed, local food supplies must be provided, and regular communication and transportation between islands must be established. In the future, geography instructors will surely offer students an opportunity to learn of the many important islands that have received little or no attention in the past.

A third portion of the earth's surface that the air age has brought into prominence is sometimes spoken of as the underdeveloped countries. While it is difficult to place the underdeveloped countries in a definite position, it is proper to say that in general they are located in that band of earth known as the tropics. They include Indonesia, Thailand, Burma, India, Pakistan, Iraq, Iran, Lebanon, Jordan, Israel, Egypt, Ethiopia, Lybia, Liberia, and many others. If you wish to play an interesting game, ask yourself and perhaps your friends these questions. "What do I know about an underdeveloped country like India?"; "What should I know about the several underdeveloped countries that loom so prominently in our air age world?"; and "What steps should the schools take to introduce America's children to that half of the world's population living in underdeveloped countries?"

Many of the so-called underdeveloped countries are located in Asia and Africa. According to an article written by Patrick J. Malloy entitled "What Are We Learning About Asia" for the March 1955 issue of *Social Education*, the answer might well be "very little." Mr. Malloy says: "Let us not lose sight of the fact that . . . we are graduating from our high schools a group of students who must live in a world that is no longer protected by distance barriers, and yet these students will be essentially ignorant of ¾ of the world in which they must live; a world from which they can no longer escape, and a world which has become very small."

As a further illustration of the importance of the underdeveloped countries of Asia and Africa, we have only to remember that very recently the leaders of 29 nations representing over a billion people met at Bandung in Indonesia for the first Asia-African Conference. Much could be said about the geographic significance of this meeting; however, the most important observation is surely this: the air age has made it mandatory for schools to offer a greatly extended and enriched geography program which will include an adequate study of Asia and Africa. In addition, adult education leaders might well use every possible media including the motion picture, the radio, and television to acquaint out-of-school citizens with their neighbors in Asia and Africa:

International Understanding Essential

In this emerging air age world there is one objective toward which all unselfish men and women can strive, that of maintaining world peace. The time has come when the nations of the world should solve their troubles around the conference tables of the United Nations, when there should be a free flow of goods, services, and ideas between world neighbors and where freedom shall exist for all mankind regardless of where they may live. Let us use our labors for the construction of a society of plenty for all.

Our present-day geography student understands what is meant when men in high places speak of "the shrinking world," "the global world," "one world."

He recognizes the fallacy of nations trying to live in isolation and the necessity of nations grouping themselves together in the United Nations framework where the work of lowering barriers between men and nations goes on with vigor.

The good geography instructor knows the importance not only of teaching carefully selected geographical facts and understandings but desirable attitudes as well. Attitudes such as the following seem to fit with the air age: (1) a determination to know other persons as neighbors; (2) a readiness to consider carefully points of view different from their own; (3) a determination to respect those who honestly differ from them; (4) a determination to understand what people and nations other than ours want from their environment and the environments of their neighbors; (5) a determination to look at world problems and issues with an international mind.

Implications for Curriculum Development

Educational leaders planning both school and adult education innovations can hardly overlook the great change in our world community brought about by the tremendous expansion of global aviation. In planning new curriculum offerings in harmony with this change, these leaders will surely make adequate provision for the teaching of air age geography. This program will be much more prominent than the existing one in elementary and secondary schools and new adult opportunities to teach about the world community will surely be provided. The alternative is to accept a standard of geographic literacy that spells defeat for our nation as a world leader.

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Aviation Education *in* California

By W. EARL SAMS
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RECENT developments in aviation education have stimulated new thinking in California. Most educators have long realized that the advancement of successful, economical, and comfortable air travel has important implications for the curriculum of our public schools. Many have attempted to incorporate appropriate units of instruction and offer elective courses of various types. Approximately seventy-five high schools of California and fifteen junior colleges offer a variety of courses in aeronautics with emphasis which range from ground and flight training for pilots to units of instruction concerned with the problems and potentialities of civil aviation, community planning to provide airport facilities properly placed with reference to the rest of the community, and career opportunities in aviation.

An extensive curriculum developmental project is being co-sponsored by the California Aviation Education Association and the Aviation Committee of the California Association of Secondary School Administrators. These two associations have been working during the past year in an attempt to revise the proposed course of study for aviation in all grade levels from the kindergarten through the junior college. The Administrators Association has been working under the leadership of Mr. Arthur Bloom, Principal, Pleasant Hill High School, Concord, California, who has had many years of successful experience with an elective course in aviation for high school students which is, to a degree, articulated with the local Civil Air Patrol cadet activities of the community. The California Aviation Education Association has been working under the leadership of Mr. Alvan Waltz, Aeronautics Instructor, John A. O'Connell Vocational High and Technical Institute of San Francisco. Subcommittees of the California Aviation Education Association are working at each one of the grade levels: elementary, intermediate, junior high school, high school, and junior college. The work of all committees is moving ahead with dispatch. The project is co-ordinated by Dr. J. Wesley Bratton of Long Beach State College. Particular stress is placed at the sixth grade on an aviation unit associated with the study of the Western Hemisphere and Pacific area. Students enjoy a brief study of the influence of the airplane as one of the integrating factors in modern life, and the possible future developments of aviation and important sociological implications. Some science of flight is often also included, particularly as the unit is developed in districts which are surrounded by the aircraft industry.

The Junior High School Committee has undertaken to produce units of in-

struction pertaining to the following subjects:

1. Science of flight
2. Social significance of aviation
3. Communications, local, global, and intracultural
4. Career opportunities in aviation, both civil and military

The High School Committee found it was necessary to break into three separate groups designed to produce proposed curricula for elective science courses of one-year duration, the industrial arts unit approach and technical courses for aircraft and engine mechanics with the vocational emphasis. These teachers all agreed that there are many opportunities for integrating the subject of aviation into existing curricula and during a recent curriculum study noted that all modern high school textbooks in history, geography, mathematics, and science contain modern units on current developments in aeronautics.

Approximately twenty of the high schools in California provide orientation flight as an integral part of the laboratory experience in the field for the aeronautical science class.

Some junior colleges provide specialized instruction including pre-engineering, aircraft and engine mechanics courses, airline transportation, hostess training, and flight training. A few colleges provide an extensive flight instruction program including a commercial pilot's license and instructor's rating.

As the educators of California meet to reappraise their aviation curricula and prepare proposed revisions, they become more aware of the problems and potentialities of civil and military aviation and the need for developing appropriate curriculum materials for all grades in the public schools.

A statement recently made by Mr. Donald W. Douglas to the Aviation Committee of the California Secondary School Administrators is pertinent to this subject. "Aviation in its many branches plays an important part in the business, social, and political life of the world; so it seems to me that specific aviation subjects properly belong in the secondary school program." General Robert W. Harper, when in command of the training program for the Air Force in speaking to the administrators said, "We must see that our youth is given an understanding of the implications of aviation as early as possible . . . we must probe more deeply into the work of preparing our youth for their place in the Air Age as it matures . . . now in an Air Age when power is molding world society, aviation education is a must."

Governor Goodwin J. Knight, speaking before the California Aviation Education Association Annual Conference, April 23, stated that he recognized the importance of aviation education in the public schools because of the influence of air transportation on the world today and many problems of community planning. The Association at its April Conference selected Mrs. Marian Wagstaff, professor of Education at the Los Angeles State College, as its new president and re-examined its constitution under which it is incorporated in light of its two major objectives for the year: curriculum and appropriate legislation. The preamble of the California Aviation Education Association by-laws suggests the reason that requests are frequently received for copies of the by-laws of this organization: "An association organized;

to aid in the development and improvement of aviation curricula in the schools of California; to establish uniform accreditation, course titles, course numbers and units of credit for all aviation courses of instruction; to promote closer affiliation between educational institutions and the aviation industry so that programs of aviation education may better provide for the needs of the industry; to integrate programs in aviation education; to correlate aviation education with basic concepts of general education; and to promote greater cooperation and interchange of ideas among the teaching and administrative personnel of the schools participating in aviation education.

In order to accomplish its objectives, the association is administered by a board of directors made up of eighteen voting members from the following representative categories: junior colleges, four-year colleges, high schools, elementary schools, technical institutes, aircraft industry and related activities. Many of the affairs of the association are carried on by the two separate sections; one in northern California, the other in the southern end of the state. The most influential event of the year is the "Air Youth Day" which is designed to give industry and business and professional aviation organizations an opportunity to pay tribute to outstanding aviation students, their teachers, and schools.

The association, realizing that existing aviation education code provisions which were drafted in 1945 were in need of revision, proposed that Assemblyman Carley V. Porter introduce legislation to modernize the Aviation Education Law in California. AB 3388 was introduced to authorize and direct the Department of Education to administer a liability insurance program and the necessary supervision to insure that the safest possible practices prevail at all times in connection with flight programs. The Bill also suggests the kinds of curricular experiences in aviation that are needed at all levels, specifying that the State Department of Education shall urge governing boards of school districts to develop aims and purposes of education which will provide appropriate aviation concepts and experiences at all grade levels and in appropriate courses, through integration and the elective courses. During the March conference on curriculum held by the association, two Naval aviation cadets — Terry Saville and Edward Fullerton — appeared before the committee in Sacramento and related many features of the Navy ground and flight training program that have important implications for the high school and junior college aviation courses. Cadet Fullerton, who had been a student at Santa Rosa Junior College where he had taken aviation courses, stressed the importance of preliminary training in aviation for maximum success in the military flight training cadet programs. Ten years of experience with aviation education courses of various kinds in California has produced an excellent background of post World War II curriculum and operation practice.

The aviation education efforts in California have been augmented by recommendations provided by the California Aviation Education Advisory Committee, made up of membership from twenty organizations concerned with both civil and military aviation. These are as follows:

1. Aero Club of Southern California

2. Agriculture Aircraft Association
3. Aircraft Industries Association
4. Air Force Association
5. California Aviation Education Association
6. California Aeronautics Commission
7. California Association of Secondary School Administrators
8. California Aviation Trades Association
9. California Association of Airport Executives
10. California Junior College Association
11. California State Colleges
12. Civil Aeronautics Administration
13. Civil Air Patrol
14. Flying Farmers Association
15. Hughes Aircraft Company
16. Northrop Aeronautical Institute
17. Trans-World Airlines
18. United Airlines
19. U. S. Air Force
20. U. S. Navy

The Advisory Committee predicated its recommendations on the following concepts:

1. That aviation is a prominent feature of California's economy
2. That America's strength is dependent upon its power
3. That the interest of youth in aviation can be used by teachers to motivate learning, and the training of these youth is our goal
4. That education in California can help provide the much-needed personnel for civil or military jobs in aviation
5. That an informed public will help solve our aviation problems and make maximum use of its potentialities
6. That the dilemma of overcrowded highways can be lessened, as more of the general public take to the air with their own aircraft
7. That the successful use of air transportation by more of the general public depends upon an adequate program of aviation education.

Recommendations to the California State Department of Education include the following:

1. Assign a full-time air-borne consultant to Aviation Education, and that in consideration of the responsibilities of the consultant and the demands upon his time and travel to adequately carry out the intent of this recommendation, a typical modern utility aircraft should be obtained and operated by the Department of Education in pursuit of its aviation education responsibilities.
2. Recommend that the Curriculum Commission, the State Social Studies Committee, and any other such committee be urged to include aviation at appropriate grade levels, and that aviation should be integrated into other subjects at all grade levels, and that suitable materials be made available.
3. Augment the existing Aviation program by conducting a positive program to inform counselors of the immediate and prospective needs of the air industry, which would include the motivation and guidance of qualified youth to train for the aeronautical fields. Such guidance should start in the junior high school.

4. Augment the existing aviation program by conducting, or lending active support to, teacher institutes and workshops to demonstrate to teachers how aviation material can be integrated into related curricula of elementary and high schools.
5. Take appropriate measure to insure that aviation education is included as a part of the requirements of teacher training in obtaining a California teaching credential.
6. Establish an adequate central agency, whereby information and facts may be obtained relating to the needs of the industry having important implications to the vocational plans of California youth.
7. Continue to explore the possibility of adequate support and implementation of the aviation education program in the California schools.
8. Continue the co-ordination of various state agencies to implement the aviation education program in the California schools. We recommend in particular that the Department of Education should continue its program of teacher education through workshops, institutes and other means.
9. We recommend the reappointment of an Aviation Education Advisory Committee to help the Department of Education implement the aviation education program of the California schools and proposals indicated above. As an indication of the effectiveness of the advisory committee, we further recommend that you provide us with a statement outlining your reaction to the above recommendations, and the action you plan to take to implement said recommendations, setting forth any further steps we should take to assist you.

The California Aviation Education Advisory Committee further recommended that the State Department of Education convey to teachers, curriculum co-ordinators, and administrators in the California schools the concept that the modern curriculum should emphasize:

1. The importance of related mathematics, science and physics as background information for technical employees of the Aviation industry.
2. The importance of orientation to the general field of aviation (history, principles of flight, airport needs, weather, etc.) as background information for both the prospective employees of air transportation and the general public.
3. The importance of exploratory educational experiences at the high school level that will give youth a basis for a well-rounded appreciation of the air age through a study of aviation science, global geography, air transportation problems and other social, political and economic implications — these experiences and studies to motivate also the student's interest in the need and importance of aviation to the protection of our country, our liberties, and our way of life.
4. The concept that aviation constitutes our first line of defense and the career opportunities of the Air Force and Naval Aviation

should be a prominent consideration in the curriculum of our public schools.

5. The importance of special technical courses for aircraft and engine mechanics, pre-engineering, electronics, and related technical training, especially in those junior college districts containing aircraft manufacturing, maintenance and service agencies which have critical personnel needs. Such courses should not be established indiscriminately, but can and should be offered in districts where it will meet the needs of all youth.
6. The importance of considering flight training where suitable facilities are available, at the junior college level, in those districts where such a course will meet the particular needs of the youth.

The training of teachers in aviation education has been receiving attention in California during the past three years. Special emphasis on the construction of curriculum materials associated with actual experience in aviation has been provided for teachers during two weeks of work and visitation in the field. The two state colleges of Long Beach and Los Angeles, California, again this year offered a workshop from August 1 through August 12, where principals, curriculum-co-ordinators, and teachers can derive understandings about aviation appropriate for their own needs and capacities, through participation in a two-unit upper division of graduate credit workshop.

BOOK REVIEW

(Continued from page 38)

pronouncing words. He gives the impression of a midget trying to shout down a host of giants.

Among the false assumptions on which Flesch's theme is developed are the following:

1. Figuring out a word from its meaning in context is pure guessing.
2. Letters in themselves have meaning.
3. Pronouncing words is reading.
4. The eminent leaders in the field of reading do not advocate systematic presentation of phonics.
5. The teaching of an initial sight vocabulary is continued until 10,000 to 20,000 words are acquired by this method exclusively.
6. In contradiction of the above, that guessing words is used exclusively throughout elementary and secondary schools.
7. That the only available American primer for the teaching of phonics is Hay and Wingo's *Reading with Phonics*.
8. That because one five-year-old learned to read successfully through the phonetic approach, and because phonics helped one sixth-grader to improve in reading, phonics is a preventive of all reading problems.
9. That all children, regardless of native endowment, rate of maturity, or physical well-being are equally ready at age five to learn to read.
10. That all parents will do more good than harm by forcing their five-year-olds to study phonics.
11. That all remedial reading cases stem from one "simple reason".
12. That the retarded reader problem is a problem of American schools exclusively.
13. That very limited observation of classroom teaching is adequate evidence of present day practices in all schools throughout the United States.
14. That the extensively validated research findings of the leading educators and psychologists in the field of reading are to be lightly discredited in favor of the conclusions drawn from the superficial observations of one writer, Rudolph Flesch.—LINDA C. SMITH, Associate Director, Betts Reading Clinic, Haverford, Pa.

High School Aviation Education *and the* Aviation Education Program *in the* Clover Park Schools, Tacoma, Washington

By FRED V. MINER
Aviation Education Supervisor
Clover Park Schools
Tacoma, Washington

AVIATION is failing to attract our youth in sufficient numbers to man our commercial and military establishments and we are making slow progress in building a private aviation industry.

An amazing mass of evidence indicates that aviation has lost the American boy. There is an alarming drop in the rate of issuance of new pilot certificates; a steady decrease in the number of newly licensed maintenance personnel; an alarming deficiency of technicians, aeronautical engineers, and aeronautical scientists; and a reluctance to accept careers in military aviation. This evidence could be expanded by citing the decreasing number of flight schools and the dwindling number of aviation technical schools.

The significance of this situation is not lost to those who think seriously about our nation's future, and the future of aviation. We dare not neglect aviation in the training and experiences of our youth. Aviation's new duties, new burdens, and new responsibilities will rest upon these young people. We must help them prepare and the time is short.

Aviation education in the public school is democracy's logical answer. Aviation education efforts have been and are currently being undertaken on a national scale. These efforts are predicated upon the assumption that we must produce more Air-Minded Citizens. As a result of this philosophy these programs have operated in the general education areas and have been most effective at the elementary school level. The United States is already a nation of Air-Minded citizens. We have as a nation whole-heartedly adopted the airplane. Our use of the airplane in commerce, transportation, business, agriculture and national defense is adequate evidence of this acceptance. Why then is commercial and military aviation failing to attract youth in sufficient numbers and why is aviation technical training neglected to the extent that it has become almost exclusively a military responsibility?

The answer lies in our antiquated and narrow concept of secondary education. The Pre-professional New England Academy is still the pattern from which our high schools are molded. *High schools are no longer exclusively engaged in preparing students to enter the professional college courses.* High school curriculums must be revised with this fact in mind. Compulsory high school education for all, military service, and the air age all demand exten-

sive changes in our curriculum. *Aviation education must without delay find a place in an expanded high school curriculum.*

Aviation education in the elementary school is a success. I have been attending aviation education workshops, aviation education conventions and curriculum conferences across the nation and find that it is the elementary school teacher who dominates these gatherings. At the elementary age boys and girls receive aviation education from parents, television, radio, comic books, and from their air age teachers. These elementary school teachers use the students' natural interest in aviation and achieve outstanding results in the enrichment of existing subject matter. Aviation is easily integrated into elementary science, into geography, into the social studies etc. Our children are air-wise and know a great deal about the airplane, about the newest jets, about helicopters, and even about rockets.

It is important to recognize that this type of integrated approach will not work successfully in the high school. Much aviation education effort at the secondary level has failed because the approach was not geared to the student's age and interest level. Students who have learned to discuss aviation intelligently and to identify aircraft as eighth grade students will not be satisfied to have high school mathematics and science teachers attempt discussions with them regarding problems of jet flight, navigation, and meteorology. *Aviation education at the secondary school level must be more than enriched general education: it must be aviation education, technical, and specific enough to satisfy the natural interests of high school boys and girls and be a challenge to their maximum capabilities.*

Clover Park Aviation Education is based upon this philosophy and has experienced a steady growth since its inception in 1945. Clover Park is in most respects a typical school system of about one thousand high school students. The area served by the school is middle class residential and the aviation education program is organized within the framework of the general education high school.

The program of aviation education has developed gradually. The start came during the World War II period. The school authorities at that time provided in the construction of an industrial arts shop, an area suitable for the instruction of airplane mechanics. The first mechanic training classes were organized in the fall of 1945 and in the spring of 1946 Clover Park received a C.A.A. certificate as an approved mechanic school. Within a year or two the program was extended to include the Commercial Pilot Ground School subjects and then this course was followed with actual flight instruction. Hundreds of the graduates of these courses are now helping to man our aviation establishments both military and civil around the globe.

Two of the most interesting features of the organization are first, an industrial arts model building course available in the eighth grade as an elective and second, a nine-week aviation orientation and guidance course taught in the ninth grade and required of all ninth grade boys. The model building class is of course extremely popular. Many boys develop here an intense interest in the technical aspects of aircraft development and design. Model

building provides an outlet for competitive desires through model designs and model flying competitions. Model classes are taught by aviation department instructors who are accomplished flyers and modelers themselves. These model classes are asked each year to provide half time entertainment at the University of Washington basketball games, and they stage demonstrations of flying and modeling skill frequently at our own football and basketball games.

The nine week guidance course was developed to solve a problem of early guidance and direction for students who were planning their senior high school programs. A natural high school boy's reaction to aeronautics is: "What's in it for me?" This required course is designed to answer that question as completely as possible. The course explains the training necessary for the various branches of aviation and the competence required for the different Civil Aeronautics Administration certificates. It also explains in detail the pay and type of working conditions to be expected in various aeronautical vocations. Military aviation comes in for its share of discussion and it is here the boys start making their first adjustments to careers in Military Aviation. This course was developed and organized by Mr. Wilbur Snyder, aviation instructor, who won a trip to the Wright Memorial Dinner in Washington, D. C. as a reward for this unique contribution to aviation education.

Students may go on to more advanced experiences as soon as they enter the senior high. For those tenth graders who are interested in flying, a course called Aviation Science Pre-flight is available. This class is a regular ground school course which prepares the student for the commercial pilot's written examination. Girls too are interested in this course, as some of them are interested in becoming air line stewardesses and others wish to learn to fly. This course enrolls about seventy new students each year.

When students have completed the pre-flight course, they may enroll, on the recommendation of the instructor, in actual flight training. Qualified students pay a laboratory fee of about three dollars an hour for their flight instruction. No academic credit has thus far been given for the flight instruction but this fact has not resulted in any lack of interest on the part of the would-be pilots.

Clover Park high school students take aviation training along with their regular courses. Boys and girls who struggle with French irregular verbs the first hour may be flying the seaplane or the link trainer the second. Approximately one hundred students are currently enrolled in the flight and ground school courses.

Students who are interested in the mechanics course enroll in the tenth grade and continue their mechanic training along with regular academic classes. They become completely certified mechanics upon the completion of the four year aviation mechanic course. Many of the mechanic students also wish flight instruction and they are enrolled in the flight course during their senior year. The mechanic students have an opportunity to work on a variety of aircraft; at present the school owns a Cessna 140, a Navion, a couple of Piper Cubs, a Cessna 170, and has acquired a helicopter this past year. The school squadron undergoes fre-

quent changes because additional planes are constantly being financed by rebuilding and selling damaged aircraft.

The aviation department currently employs four full time instructors and the department supervisor; Mr. Kaldor and Mr. Cassidy, mechanic instructors, Mr. Wilbur Snyder, pre-flight and flight instructor, and Mr. Earl Snyder, model building, aviation guidance and flight instructor.

I have been working for more than fourteen years exclusively in the field of aviation education and the Clover Park Story has emerged as my contribution to the philosophy of aviation education. This past year I have been engaged in study and travel as a Ford Foundation Student in Aviation Education and this study has given me an opportunity to evaluate the Clover Park Approach in relation to other aviation education efforts. The following conclusions appear unmistakably clear.

1. The success of high school aviation courses will depend upon the amount of first hand experience with actual flying.

2. The success of high school aviation courses will depend upon the certainty given the student that he is acquiring information and skill for use in a future vocation.

3. The success of high school aviation courses will depend upon the degree to which we utilize teachers with extensive aviation experience backgrounds.

Similar conclusions were voiced in an aviation motivation report prepared by the American Institute of Research and read at the Second National Aviation Education Workshop held at the University of Colorado in 1953. Aviation education at Clover Park is based upon these conclusions and has been eminently successful. Little attention has been given, however, to these criteria in the planning of most high school aviation education courses. These criteria demand practical courses and teachers with aviation backgrounds. It is sad that many high schools are still trying to support theory courses called aviation education taught by teachers with little technical knowledge of aviation. Little evidence exists that public schools generally are willing to assume these new responsibilities of the air age.

Successful programs, isolated as they are, point the way. Education and democracy must meet this new challenge of the air age.

The United States Office *of* Education *and* Aviation Education

By DR. WILLIS C. BROWN
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THE impact of aviation on the lives of people everywhere has become one of the social and technological forces with which those responsible for schools must reckon. The educational problems created by aviation are of a nature that challenge local, State, and national leaders. At the national level, among other interested agencies, the U. S. Office of Education (USOE) is designated by Congress as the federal agency concerned with education. Organizationally, it is a part of the U. S. Department of Health, Education, and Welfare, along with the Public Health Service, Office of Vocational Rehabilitation, and other agencies.

The interest and activity of the Office in aviation goes back to the time when, during barnstorming days, it was realized that aviation had a commercial future. The Office has since assisted many States in setting up a variety of vocational aviation courses.

In 1936, *Aviation in the Public Schools* was produced by the Office of Education. It described the status of aviation in schools and described its impact on the several branches of the school program.

During World War II, in 1942 and 1943, the Office produced bulletins entitled *Pre-Aviation Cadet Training in High Schools* and *Pre-Flight Aeronautics in Secondary Schools*. These were prepared as a result of meetings of nationally interested organizations and represented the thinking and recommendations of those early war years.

During the war years, courses such as aircraft welding, electronics, instrument installation and repair, and hydraulics, as well as the usual aircraft and engine mechanic courses, were offered to thousands of students of all ages in high schools, vocational schools, in technical institutes, and in evening classes of such schools. Many of these courses were financed with State or Federally matched funds. Such courses, together with a host of private vocational and technical school courses prepared the thousands and thousands of war production workers that made possible the rapid build-up of the aviation industry.

The unsung work, loyalty and efficiency of teachers and schools working together with Government and Industry made possible the might of our World War II Air Forces. This then was one phase of Office of Education wartime activity. The Government part of this process stemmed from wartime legislation and appropriations to the USOE, which administered the funds using

existing channels of cooperation with State departments of education and local school systems.

With the end of the war, public education took a new look at studies and reports which were put aside for wartime emphases. Some of these were *The Seven Cardinal Principles of Secondary Education,* dating back to 1918; *The Ten Imperative Needs of Youth;* the report of the American Youth Commission, entitled *Secondary Education for Youth in Modern America; A Look Ahead in Secondary Education,* which was published by USOE; and the 1955 Education Policies Commission report, entitled *Public Education and the Future of America.*

All of these reports, in general, pointed to certain needs of large groups of youth that were not being met. Among the pupils less well served by many schools were the groups who were neither college preparatory nor headed for vocational education. Too often it was found that this group received a "watered down" version of the college preparatory course.

The Office of Education has helped focus attention on this particular group and their needs in order that they may obtain from their schooling a better preparation to live a useful life in this different post war society. Emphasis needs to be given in the curriculum to changes brought about by the industrial era in which aviation plays such a large part.

Peter F. Drucker, in his book *The Future of Industrial Man,* pleads for an understanding of societal changes which take into consideration the industrial world. He says, "The physical reality in which live the overwhelming majority of the five hundred million people on the European and North American continent is that of an industrial world. Few of us could live a single day without the products, services and institutions of the industrial system. Everything in our lives which relates to the routine of living is shaped and determined by it. Most of us depend upon it directly or indirectly for our livelihood and our pleasures. Its social problems are our individual problems; its crises are direct attacks upon our individual security and social stability; its triumphs are our proudest achievements."

If the school curriculum is to be made more meaningful, it follows that increasingly it should interpret socio-economic and technological forces. Many teachers are now doing this in a fine way. Still it is important that more teachers should learn to take advantage of aviation as one of these forces and as an aid to learning. All through the elementary grades and in secondary classes aviation needs to be integrated appropriately or, possibly, units such as airport services, air transportation, airplanes and farming, etc., devised to fit the curriculum.

Teachers should realize that the interests of youth go far beyond "Principles of Flight." There is a whole new range of youth interest which includes weather, biology of flight, and even a realistic evaluation of how far along we are toward space flight.

We rightly place emphasis on meeting the needs of youth, so it is important to see what can be done in the field of aviation to meet these needs. First, aviation has proven to be a strong motivator. Many teachers find that the clever use of aviation in class work makes the class "come alive." It is im-

portant that teachers read up, study, ask questions, and experience flight themselves. When this happens the teacher is raised in the esteem of the pupils, as she then talks from personal experience.

Needs of pupils, of course, change with the years. In the elementary school, needs may include fundamental concepts of the individual and his environment. Along with the postman, doctor, and fireman should be the bus driver, the conductor, the pilot, stewardess, and the men that make and service airplanes. We know that many a retarded reader finds in airplanes the interest that creates the desire to read.

As the child grows his needs are satisfied in singing, drawing or painting pictures of airplanes, making believe by creating out of boxes and boards the play jet plane of which he visualizes himself the pilot.

Later he becomes interested in details of how and why, and wants to learn to identify every plane he sees flying overhead. Soon he develops greater dexterity so that at about age 10 to 12 he learns how to build model airplanes that really fly. This opens the vista of science. He needs to know exactly why planes fly and what scientific principles govern each part or action, because this knowledge will enable him to make his plane fly better.

In high school he may, in his own way, decide he wants to be a commercial pilot or a flight engineer or an aircraft maintenance mechanic. Again, he may live in a manuafcturing community where he sees the need of learning one of the aircraft trades.

Another possibility is that he hears and reads about the big field of opportunities in aeronautical engineering or in pure research. Unless we interest and train youth so that our basic research is accelerated, aviation will suffer along with all industries that use the data of research for future developments. These are all very powerful motives and give us our cue in determining needs which in turn should govern the complexion of program offerings.

Regarding the curriculur aspects of the problem, it appears to me that, because of the wide variety of needs, the elementary teacher will "integrate", aviation as far as she is able to do so. The encouraging part is that today teachers have more and better resources on which to draw. They can also experience flight very inexpensively by making some trip by plane. A textbook could be (and has been) written on the use of aviation in Elementary and Junior High School.[1]

In Junior High School, aviation can be worked into a Core Program, taught as an industrial arts exploratory course, as a unit of science, or offered as an extra curricular activity.

Senior High Schools, according to the Office of Education bulletin *Offerings and Enrollments, 1948-49*, show students (grades 7-12) enrolled in courses titled Science of Aeronautics, Industrial Arts Aviation, Meteorology, Navigation, and Transportation. In the vocational field, courses in aircraft and engine mechanics are offered. I believe that, due to modern developments, more emphasis is needed on modern technology through every possible means. One of the best means, of course, is to broaden offerings in science.

During the Senior High School years, guidance is especially important. In-

1. *Aviation Education Service Book.* Hastings House. 855 p.

terests, skills, and abilities identified during this period in math class, science courses, vocational courses, or even in club activities may well point the way toward future specialized training. Many youth showing only average marks generally, but with an absorbing interest or skill in one field of aviation study or club activity, have gone on to be leaders and key personnel in the aviation industry later.

It should be noted that statistics[2] show United States engineering school enrollment way below demand. We now graduate about 40,000 engineers per year. The present shortage is about 40,000 engineers and, with current enrollments, it will be about 1960 before we close this gap.

Incidentally, the best available figures show Russia graduating about 53,000 engineers per year and their rate is increasing. Also, they graduate about 60,000 at the technical institute level, against our 10,000 per year. Theirs is a four-year technical institute and ours is a two-year institute.

Let me repeat then, we need to identify earlier those with special science aptitudes and give them added training in secondary schools, including modern applications of math, physics, chemistry, biology, and subjects to develop technical skills. In this way we shall give opportunity to more youth with capacity to take later training in aeronautical engineering.

While discussing shortages, the shortage of qualified teachers, approximately 125,000 this year, should cause us all to try to make teaching a more attractive career. We should also encourage pupils with "possible suitability" to look forward to a career in teaching.

This leads to the importance of the broad field of teacher education as it relates to aviation education. How can those teachers who are unacquainted with what aviation means to our modern society interpret this to their classes? Without going into details, which could well concern a separate article, such teachers can be found in our Teachers Colleges and also teaching in our schools.

The remedy, of course, is to alert Teachers Colleges to the need of including aviation and its understandings in their pre-service courses. The other half and the bigger part of the job is to reach teachers on the job with "In-Service" aviation education.

Teacher summer courses have done much to improve this situation but the need exists for more workshops in more universities. The "Air Age Institute," as carried on systematically in New York City and many other cities for the re-education of in-service teachers, is most valuable and deserves the praise and cooperation of all concerned.

There is no substitute for the informed and enthusiastic teacher who can skillfully use aviation in her classroom as one of the modern forces which is changing the world in which we live. I believe that teachers can increasingly enrich their programs in fields such as industrial arts, science, math, social studies, vocational subjects, and club activities by proper use of aviation. Such enriched programs would do much to bring school offerings nearer to meeting the needs of youth.

The Office of Education, in its aviation education interests, then uses these emphases in order to encourage, aid and promote the cause of education, of

2. Joint Report of American Society for Engineering Education and Office of Education.

which aviation education concepts are a vital part.

As a Federal agency we live within the framework of our enabling legislation, recognizing that education is a function primarily of local communities. We plan, cooperate, and work with others to assist in the improvement of education.

The services available in aviation education through the USOE are as follows:

(a) Liason with other Government agencies in working toward common goals. Such agencies as Civil Aeronautics Administration, Civil Air Patrol, the Air Coordinating Committee, U. S. Air Force, and U. S. Navy are examples of this liaison.

(b) Services to professional organizations such as the National Aviation Education Council, the National Education Association, and State, county, and city school organizations.

(c) Advisory services to other organizations interested in Aviation Education, such as National Aeronautic Association and the National Exchange Clubs.

(d) Services to State departments of education.

(e) Publications of the Office of Education on the subject of Aviation Education. These are listed in *Office of Education Publications on Secondary Education.*

(f) Packet service, containing significant publications of interest and value to all States, sent to list of State departments of education personnel.

(g) Services to Teachers Colleges and Universities. These may be consultative services or request for workshop assistance.

(h) Services to other teacher and supervisor conferences and aviation institutes.

(i) Loan packets of source materials for those doing research.

(j) Correspondence with teachers, supervisors, principals, and superintendents regarding their problems in aviation education.

(k) Phone inquiries and personal conferences or consultations.

With aviation listed as the largest industry in the nation and airlines setting new records for speed and safety of air travel, we, as school people, must keep up to date with developments. Someone has said that with the advent of modern aviation, we have suddenly found all the nations of the world practically sitting in our lap and we haven't yet learned to feel comfortable. More power to the teachers who see today's problems clearly, who can interpret the social, economic, and technological developments of aviation to the citizens of tomorrow. Let's help them.

COMING EDUCATIONAL EVENTS

September 17:	Citizenship Day
" 25-27:	New England Reading Conference, New Ocean House, Swampscott, Mass.
October 4:	Rural School Charter Day, NEA Dept. of Rural Education
" 6-7:	Maine State Teachers Association, Bangor, Maine
" 6-8:	Fall Regional Conference, National Science Teachers Asso. NEA, Austin, Texas
" 9-11:	New England Superintendents Association, New Ocean House, Swampscott, Mass.
" 9-12:	National Conference of County and Rural Area Superintendents, NEA, Dept. of Rural Education, San Diego, Calif.
" 13-14:	Vermont State Teachers Association, Burlington, Vermont
October 10—Nov. 2:	National Conference on Intramural Sports for College Men and Women, co-sponsored by American Association for Health, Physical Ed. and Recreation, NEA; College Physical Education Association: and National Association for Physical Education of College Women, Washington, D. C.
October 15:	Connecticut All-State Reading Conference, North Haven High School
November 6-8:	Northwest Regional Drive-In, jointly sponsored by the American Association of School Administrators and NEA Dept. of Rural Education, Spokane, Washington
" 4-5:	Southeastern Regional Conference, NEA Dept. of Classroom Teachers, Asheville, N. C.
" 6-12:	American Education Week. Theme: "Schools—Your Investment in America."
" 9-12:	Regional Conference, International Council for Exceptional Children NEA, Nashville, Tenn.
" 23-26:	Southern Business Education Association, NEA Dept. of United Business Education Association, St. Petersburg, Florida
" 24-26:	Annual Meeting, National Council for the Social Studies, NEA, N. Y. City
" 25-27:	National Council of Teachers of English, Hotel Commodore and Hotel Roosevelt, New York City
" 27-29:	Sixteenth Christmas Meeting, National Council of Teachers of Mathematics NEA, Washington, D. C.
" 27-30:	Winter Regional Conference, National Science Teachers Association NEA, Atlanta, Georgia
Nov. 28—Dec. 1:	White House Conference on Education, Washington, D. C.
1956	
February 3-5:	South Central Regional Conference, NEA Dept. of Classroom Teachers, Austin, Texas
" 15-17:	Southern Regional Conference, Am. Asso. for Health, Physical Ed. and Recreation, NEA, Nashville, Tenn.
" 16-18:	Annual Convention, Am. Asso. of Colleges for Teacher Education, NEA, Chicago, Illinois

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